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JOURNAL

OF THE ROYAL STATISTICAL SOCIETY

PART I, 1928.

CROP ESTIMATES IN ENGLAND.

By H. D. VIGOR.

[Read before the Royal Statistical Society, November 15, 1927, the Ex-President, Mr. G. Udny Yule, C.B.E., M.A., F.R.S., in the Chair.]

SINCE the present official system of estimating the yields of the principal crops of Great Britain year by year was established in 1884, it is noteworthy that practically no discussion of the working and results of the system has taken place before the Royal Statistical Society or any other body, and that detailed comment upon the results has been practically limited to the Government Departments concerned from time to time with the collection and publication of the estimates.

The yields returned and published have hitherto been accepted without serious question as reasonably trustworthy. In September, 1926, however, the *Economic Journal* published an article entitled "An Inquiry into British Methods of Crop Estimating,"* by Mr. J. A. Venn, the Advisory Economist attached to the Cambridge University School of Agriculture, in which the author set out to examine critically the official crop estimates of England and Wales since their commencement and came to certain conclusions which will be referred to later. In the present paper the writer desires to offer the results of his own investigations and to express his personal opinions on the arguments and conclusions of the article. The general question of the trustworthiness of the crop estimates

* In what follows Mr. Venn's investigation will be quoted briefly as "the article."

was dealt with in the Report on Part I of the Agricultural Statistics, 1926 (issued in 1927).

The system of the Ministry of Agriculture and Fisheries, which was developed under the direction of two distinguished Fellows and past Presidents of the Royal Statistical Society, Major P. G. Craigie, C.B., and Sir Henry Rew, K.C.B., is to obtain from local reporters (who numbered 220 up to 1918 and have since numbered about 320) an estimate of the average yield per acre for each crop in each parish. The estimated yield in a parish is multiplied by the acreage under the crop in that parish as returned by the occupiers on the 4th June, and from these parish totals the production of each county and of the country as a whole is obtained. There are upwards of 13,000 parishes in England and Wales, so that for those crops that are grown in all parishes over 13,000 separate estimates are made.

Inasmuch as the estimate per acre for each parish is multiplied by the crop area, a proportionate value or weight is given to each estimate. The large number of estimates made has also the great advantage that such errors of over-estimation or under-estimation as may occur should tend on the whole to balance each other.

An examination of a number of the returns shows that the range in the estimates as between one parish and another (made by the same crop reporter) is noticeable and indicates very clearly that much allowance is made for differences between different areas.* The difficulty in making due allowance for variations in yields increases with the size of the area, and the fact that the areas for which estimates are made by crop reporters are relatively so small greatly increases the probability of securing reliable results. It is obviously easier to furnish a figure for the yield of a crop grown on, say, 100 acres situated in one parish than a single figure for the yield of 3,000 or 4,000 acres in 30 or 40 parishes, and consequently the average of 30 or 40 separate parish estimates all based on local information, should, assuming the competence of the reporters, be nearer to the actual facts than a single estimate for 3,000 or 4,000 acres.

The system is dependent primarily on the skill and competence of the crop reporters, and secondly on the opportunities they have for testing their judgment against actual results obtained by the exact weighing or measuring of crops obtained from a known area.

* For certain important corn-growing counties, the wheat yields of which have been examined for a number of years, the standard deviation of the parish estimates, which varies appreciably for the same county from year to year, seems to range between 9 and 22 per cent. of the average (unweighted) yield for the counties.

As regards the skill and competence of the crop reporters, it need only be said that they are men with practical experience in agriculture, the majority engaged in business as agricultural land agents or surveyors, while others are farmers with wide local knowledge. In most cases they are men experienced in tenant right valuation, a class of work which involves as a matter of business the precise type of knowledge and experience which is required for estimating the production of crops. They do not, of course, rely merely on their own personal observation of the crops before or during harvest, but supplement this by enquiry throughout their parishes from leading farmers, threshing machine owners, and others qualified to furnish reliable information. This is done to a very large extent, and both verbal and written statements are obtained from such sources.

The parish estimates supplied by the crop reporters thus do not represent merely the views of some 320 skilled persons; the reporters receive and always have received assistance from many thousands of agriculturists in England and Wales in compiling their annual estimates. The ready co-operation thus received from this large number of individuals enhances immensely the value of the estimates.

The reporters are responsible in the Produce Returns solely for supplying the yield per acre in each parish; the heavy arithmetical work of calculating parish, area, county and national totals and averages is performed in its entirety by the departmental clerical staff. The headquarters staff, however, first examines the estimates parish by parish to detect possible errors and discrepancies and raises queries before the arithmetical calculations are commenced.

The parish estimates are also examined by a staff of experienced inspectors (with frequent consultations with the reporters) between the issue of the provisional estimates and the issue of the final estimates.

Short of actual sample weighings of crops in each parish in the country, an undertaking which would not only be extremely costly but also open to statistical difficulties in connection with the selection of samples for weighing, it is difficult to think of any system which is likely to afford a closer approximation to the true yield of the various crops in the several counties and in the country as a whole than the system described above. There are the repeated personal investigations of the reporters before and during harvest in the course of their private as well as of their official business, supplemented by estimates and records of actual results supplied to them from the separate parishes by their correspondents. The task is not easy and can only be undertaken by experienced men,

and it is on the competence and experience of the reporters, selected with very great care, that the Ministry must ultimately rely. During the period of over 40 years in which the produce returns have been collected, the tendency has undoubtedly been to raise the standard of competence and experience required in the appointment of crop reporters.

The number of crop reporters was about 220 from 1885 to 1918, but in 1919 it was increased to 320 and the average area of their districts was reduced. The change was made owing to the transfer to the crop reporters of the duty of distributing and collecting the acreage and live-stock schedules previously undertaken since 1866 by the officers of the Commissioners of Customs and Excise. The change involved no variation in the system of produce returns, and the comparability of the returns with those of years prior to 1919 was not affected. The reporters have, however, been brought since 1919 into even closer touch with individual farmers in their areas, and have thus still greater opportunities to supplement their personal estimates by individual records.

With this explanation of the existing system we turn to an examination of the criticisms contained in the article. The author of the article concludes that the estimates are untrustworthy and that they detract from the reputation of English agriculturists by failing to report the advances in crop yields which he considers that they ought to indicate. The reasons given for this conclusion are as follows :—

- (1) If compared with their own initial results they exhibit stagnation (*i.e.* the yields of the later decades show no appreciable advance on those of the earlier decades).
- (2) If placed side by side with an alternative series (*The Times* estimates) compiled by similar methods by more numerous local observers, they fall systematically below it, crop by crop, county by county, year after year.
- (3) Anomalies of a chronological and geographical nature are numerous.
- (4) They deny adequate expression to the occasional appearance of really good seasons.
- (5) They refuse recognition to the plant breeder.
- (6) They are out of harmony with the corresponding returns collected in Scotland and Ireland.
- (7) They fail to produce the amplitude of range found in other countries where cereals are produced under comparable conditions; here it must be admitted they suffer in common with those of Scotland and Ireland.

- (8) There is a possibility that the practice of crop forecasting, as carried out during the last twenty years, has made its depressing influence felt upon them.

The article adds: . . . "it may be hazarded that over 5 per cent. and under 10 per cent. in the case of wheat, possibly 7 or 8 per cent. for barley, 10 per cent. for oats and potatoes, and anything from 15 to 20 per cent. for roots, would not appear to be exaggerated figures to put forward after minute examination of all relevant data," as estimates of the extent by which the official estimates fall short of the actual yields.

In dealing with these criticisms it seems desirable to make numerous quotations from the original article. It is hoped that indulgence will be granted to the length of some of these quotations on the ground that it is necessary to state fairly and amply the case to which reply is being offered.

Crop Yields in Great Britain and Ireland since 1885.

The article first gives a brief history of the estimates of crop yields in the United Kingdom, and refers to the estimates put forward by Sir J. B. Lawes and Sir J. Gilbert in respect of the wheat production and consumption of the United Kingdom for the period 1852-86 prior to the commencement of official estimates in 1884. A statement that these wheat yields estimates "have universally been accepted as authoritative" will be examined later, and it suffices here to say that when Gilbert and Lawes estimated the United Kingdom wheat yield as 28½ bushels per acre (1852-67), the Scottish figure was estimated as 27¾, the Irish 23¾, and that of England and Wales 28¾ bushels. The article adds, "this was a time of high farming, and these yields probably represented the maximum achievement possible pending further scientific assistance."

The article proceeds to compare the decennial variations in the yields returned for each of the four countries, and draws conclusions generally favourable to the advancing figures for Scotland and Ireland and unfavourable to the more stationary records of England. It says that "Wheat improved in the United Kingdom from 29 bushels in the decade 1885-94 to just over 32 bushels at the outbreak of war, barley from 33·3 bushels to 34·3 bushels, and oats from 39 bushels to 42 bushels. The second decade (1895-1904) was climatically favourable and the third was not abnormal. The next ten years witnessed a decline of about ¾ of a bushel in wheat,* of 2½ bushels in barley * and of 1½ bushels in oats, in part no doubt

* The correct figures are 0·9 bushel for wheat, and 2·6 bushels for barley.

attributable to war conditions. . . . If the constituent parts of the whole country be analysed, the discovery is made that England, except in the case of wheat and beans, played little part in the upward movement, but the credit must in the main go to Scotland and to Ireland, where also the conditions which supervened after 1914 failed seriously to affect the situation."

The official figures upon which the above statement purports to be based do not altogether bear the above interpretation, for, as shown below, in England the mangold crop also recorded a distinct advance of yield in the first three decades; and in the fourth decade the reduction of yield is distinctly greater in Ireland than in England for every crop, while four of the seven crops gave lower yields in Scotland.

TABLE I.

| | | Wheat. | Barley. | Oats. | Beans. | Potatoes. | Turnips. | Mangolds. |
|----------------------------------|-----|----------|----------|----------|----------|-----------|----------|-----------|
| | | Bushels. | Bushels. | Bushels. | Bushels. | Tons. | Tons. | Tons. |
| England ... | (a) | 29.3 | 33.1 | 40.6 | 25.8 | 5.9 | 12.4 | 17.5 |
| | (b) | 30.5 | 32.6 | 40.7 | 27.4 | 5.8 | 11.9 | 18.4 |
| | (c) | 32.1 | 33.3 | 40.8 | 30.3 | 6.2 | 13.0 | 19.5 |
| | (d) | 31.1 | 30.6 | 39.2 | 26.9 | 6.2 | 12.5 | 19.1 |
| Wales ... | (a) | 23.3 | 28.0 | 32.6 | 26.7 | 5.6 | 14.1 | 16.3 |
| | (b) | 25.0 | 30.2 | 33.2 | 24.7 | 5.4 | 14.8 | 16.2 |
| | (c) | 27.6 | 31.1 | 35.3 | 27.3 | 5.3 | 15.2 | 18.0 |
| | (d) | 27.9 | 28.5 | 32.6 | 27.6 | 5.3 | 13.7 | 17.1 |
| Scotland ... | (a) | 35.3 | 35.3 | 35.6 | 30.5 | 5.6 | 14.9 | 16.2 |
| | (b) | 37.7 | 35.8 | 36.4 | 33.1 | 5.9 | 15.1 | 17.2 |
| | (c) | 40.6 | 36.1 | 38.0 | 36.7 | 6.5 | 16.5 | 18.9 |
| | (d) | 38.6 | 35.1 | 39.3 | 35.4 | 6.5 | 16.7 | 18.5 |
| Ireland ... | (a) | 20.1 | 36.4 | 41.0 | 34.3 | 3.5 | 13.1 | 14.0 |
| | (b) | 32.6 | 38.8 | 44.7 | 37.5 | 4.0 | 15.3 | 16.5 |
| | (c) | 36.9 | 43.0 | 49.5 | 45.3 | 5.2 | 17.2 | 19.4 |
| | (d) | 35.2 | 38.8 | 45.7 | — | 4.9 | 15.7 | 18.0 |
| Great Britain and Ireland ... | (a) | 29.3 | 33.3 | 39.0 | 26.1 | 4.5 | 13.1 | 17.1 |
| | (b) | 30.6 | 33.3 | 40.4 | 27.7 | 4.8 | 13.2 | 18.1 |
| | (c) | 32.3 | 34.4 | 42.1 | 30.5 | 5.7 | 14.6 | 19.4 |
| | (d) | 31.4 | 31.8 | 40.7 | 27.2* | 5.6 | 14.2 | 18.9 |

(a) 1885-94. (b) 1895-1904. (c) 1905-14. (d) 1915-24.

* Great Britain only. The figures for Ireland after 1917 are not available, and in any case do not appreciably affect the average for Great Britain, as the Irish area of beans is very small (about 1,500 acres).

The decennial averages are given in the above table, but it is not, for the fourth decade, identical with the table of the article, which has given averages for 1914-23, 1911-20, or 1912-21, instead of 1915-24 in the case of Wales, Scotland and Ireland. The reason

why this was done for Wales and Scotland is not clear, as their average yields for 1915-24 were certainly available at the same time as those for England, and the choosing of the correct period does affect comparisons.

It seems necessary, however, to take into account the area of the crops in each country to which the foregoing yields relate. Taking the four corn crops, we have the range of areas in each country during the 40 years as follows:—

TABLE II.
(Thousands of acres.)

| | Wheat. | | Barley. | | Oats. | | Beans. | |
|-----------------|--------|-------|---------|-------|-------|-------|--------|------|
| | Max. | Min. | Max. | Min. | Max. | Min. | Max. | Min. |
| England | 2,461 | 1,302 | 1,899 | 1,152 | 2,415 | 1,616 | 409 | 209 |
| Wales | 96 | 23 | 126 | 60 | 366 | 186 | 3 | 1 |
| Scotland | 80 | 34 | 240 | 149 | 1,244 | 920 | 23 | 3 |
| Ireland | 158 | 31 | 207 | 142 | 1,590 | 1,022 | 6 | 1 |

It is submitted that an advance from 1885 to 1914 of 2·8 bushels per acre for wheat on over 1,600,000 acres of every type of soil in England is not less significant than one of 5·3 bushels on only 50,000 acres of specially suitable land in Scotland; that an advance of 4·5 bushels on over 250,000 acres of beans in England is much more significant than one of 6·2 bushels on only 10,000 acres in Scotland; and that an advance of 2 tons per acre on over 400,000 acres of mangold in England is very much more significant than an advance of 2·7 tons on less than 3,000 acres in Scotland.

The more widely grown Scottish crops which show increases of yields significantly better than those in England are oats, turnips and potatoes. These and the case of Ireland will be referred to in a later paragraph.

The Estimates of Wheat Yields of the United Kingdom by Lawes and Gilbert.

The article has compared the officially estimated wheat yields with those made by Sir John Lawes, F.R.S., and Sir J. Gilbert, F.R.S., at various dates for the period from 1852 to 1886, and states "that the figures prepared by Lawes and Gilbert have universally been accepted as authoritative."

A paper on the subject was contributed by Lawes and Gilbert to the *Journal of the Royal Agricultural Society of England* in 1868. A second paper was contributed to the same Journal in 1880, and

was also read before the Royal Statistical Society on 11th May, 1880; on the same occasion a paper "On Ten Years of British Agriculture" was read by Major P. G. Craigie. The presentation of the estimates before the Royal Statistical Society had the advantage that it was possible for them to be discussed by the Fellows and visitors attending the meeting.

In 1883 a further paper was read by Major Craigie before the Royal Statistical Society on "Statistics of Agricultural Production," in which he reviewed *inter alia* the various estimates of different corn crops in this country by various authorities between 1770 and 1882. Beyond a reference to "the elaborate experiments and valuable records which Sir John Lawes now lays year by year before the country," Major Craigie made no reference to the wheat estimates of Lawes and Gilbert for the United Kingdom, except in so far as they may be referred to in the following quotation:—

"Guesses there were many at our probable acreage of corn crops before the facts were ascertained, but they were guesses at the best. Although the State did nothing in these days to help a solution, valuable unofficial efforts were no doubt made by means of more or less elaborate personal enquiries; and the labours of Mr. McCulloch and Mr. Caird deserve recognition for the remarkable approach of their estimates to the subsequently ascertained facts. Still, if we reflect on the double sources of error which must have arisen in any effort to discover our actual or relative production, when we should have had to employ a hypothetical basis of area as well as a hypothetical yield of crops, it must be apparent that a large and material step has been gained."

The step referred to is the institution of the Agricultural Returns of Acreage and Live-stock in 1866.

Major Craigie was advocating the collection of produce returns by enquiries locally throughout the country, and the reason for his omission to refer to the Lawes and Gilbert estimates, although he quoted many others, is perhaps not far to seek, if the basis of their estimates is examined.

For the period from 1852 to 1865 inclusive they had to rely on estimates alone in fixing the area under wheat in England and Wales, which comprised 85 to 90 per cent. of the total area; for Scotland also they had to rely on estimates for the two years prior to 1854 and for the years from 1858 to 1865 inclusive.

For the wheat yield they had only official estimates for Ireland and for the four years 1854–57 for Scotland. They therefore decided to adopt the average produce per acre each year, on five selected,

and very differently manured, plots (averaging two-thirds of an acre each), their total area being $3\frac{1}{2}$ acres, in the permanent experimental wheat field at Rothamsted (where wheat is grown continuously year after year), as the basis of the estimates of the average produce per acre of the United Kingdom from year to year. They came to the conclusion, however, that in very productive years the average yield of the five plots would exaggerate the yield for the United Kingdom, and in years of very deficient yield the average yield of the plots would give an unduly low yield for the United Kingdom. Before applying the Rothamsted five plots average to the area of wheat in the United Kingdom, they accordingly adjusted the yield by an amount varying each year according to their judgment, but averaging about 2 per cent.

This method of crop estimating, although of some value at the time when it was made, is open to at least three fundamental objections :—

- (1) There was no ground put forward, nor could one be put forward, for accepting the average yield of the five plots (as adjusted) as properly representative of the level of the yields of wheat for the United Kingdom.
- (2) There was no justification for the assumption that the average wheat yield of the United Kingdom went up in the same season as it went up on the five plots, or was reduced in the same season as it was reduced on the five plots.*
- (3) There was no justification for the assumption that the average yield per acre for 3 to 4 million acres of wheat would vary from year to year within anything like the very wide limits of the average yield on $3\frac{1}{2}$ acres at Rothamsted.

On the discussion of Lawes' and Gilbert's paper at the Statistical Society, the validity of the estimates was challenged by Mr. Edwin Chadwick, C.B., who said that the defective state of agricultural statistics was particularly shown by the attempt to base general statistical conclusions on the yields of a single farm. In reply, Gilbert claimed that "averaged over a period of 27 years the published estimates of Mr. Caird and Mr. Shaw-Lefevre agreed within an eighth of a bushel per acre per annum with those of Mr. Lawes and himself."

Gilbert did not claim, however, accuracy for the estimates of individual years, and it was impossible for him to do so.

As a test for their estimates, Lawes and Gilbert made independent

* It is interesting to note that in 1921, when the heaviest wheat yield officially recorded occurred, the average of the 5 plots was more than 20 per cent. below their previous ten-year average.

hypothetical calculations of home consumption of wheat each year, and after deducting imports, arrived at the estimated consumption of home-produced wheat; this estimate was compared with their calculation, based on the Rothamsted wheat yield, of home production less an allowance for seed.

The best that can be said of this test is that *averaged over a period of years* the results of the two calculations agree closely for the 16 years 1852–67 (*i.e.* before official data of acreage were available). For the period 1868–78 the calculations based on the Rothamsted plots were substantially in excess of the estimates based on consumption. The inference which might be drawn is that in the earlier period their estimate of wheat acreage was correlated to some extent with their estimate of home consumption, so that it would not be wise to attach undue significance to the apparent agreement of the two estimates of home produce; the calculations were probably not entirely independent. When, however, the acreage was independently and officially ascertained, agreement could no longer be shown.

It is when one turns to compare consumption for any year with the production of that year that many wide discrepancies are evident. For 1853–4 the United Kingdom crop estimated on the Rothamsted basis showed a deficiency of 21 per cent. from the theoretical consumption requirements (equivalent to a possible error of $4\frac{1}{2}$ bushels per acre); for 1857–8 an excess of 22 per cent. (equivalent to $6\frac{1}{2}$ bushels); for 1863–4 an excess of 20 per cent. (equivalent to $7\frac{1}{2}$ bushels), and for 1867–8 a deficiency of 34 per cent. (equivalent to 7 bushels per acre). All these figures emphasize the unreliability of the yield per acre estimated for the United Kingdom year by year. The basis of the calculations and the insufficient data available made it impossible to expect otherwise. It has to be remembered that in estimating home consumption Lawes and Gilbert were without returns showing port stocks, millers' stocks, bakers' stocks and farmers' stocks of wheat (or flour), all of which vary from year to year. It was not until the recent war that complete figures or reliable estimates under these heads were collected. Estimates of the per head consumption of wheat of the United Kingdom were necessarily hypothetical, being placed at one flat rate of 5.1 bushels per head for the first eight years, and at a higher flat rate of 5.5 bushels for each subsequent year. Data placed before the Royal Commission on Food Supplies in Time of War (1902–5) show that the per head consumption does vary appreciably in different years, and, as Lawes and Gilbert admitted, a variation of one-tenth of a bushel per head per annum represented in their calculations a variation of 1 bushel per acre per annum. A point to be noted is that when the calculations showed a surplus

of home-grown wheat above consumption requirements for the period from 1866, when official acreage returns became available, Lawes and Gilbert do not appear to have doubted the validity of the United Kingdom yield derived from the Rothamsted plots, but assumed that they under-estimated the consumption, which they proceeded to increase to 5.6 bushels and finally to 5.65 bushels per head so that they were able to bring their two sets of calculations into some measure of average agreement.

Recent investigations by Mr. R. A. Fisher into "The Influence of Rainfall on the Yield of Wheat at Rothamsted" (*Phil. Trans. Roy. Soc.*, London, B, 1924, Vol. 213) throw a sidelight upon the suitability of the experimental wheat plots at Rothamsted as a basis for estimating yields for the whole of the United Kingdom. He has dealt with the relationship between rainfall and the yield of a number of the wheat plots for a period of 60 years. His results agreed substantially with those observed in the great pioneer investigations of Hooker* for the eastern counties of England, in most respects, except that (1) at Rothamsted the relationship of yield to autumn rainfall was not so pronounced as for the eastern counties generally, and (2) at Rothamsted the relationship between yield and summer rainfall was less marked than for the eastern counties generally. The second difference is considered by Fisher to be probably due to the inclusion in Hooker's data of yields from lighter lands, more susceptible to summer drought than is the heavy loam of the Rothamsted field. The first difference is thought by Fisher to be attributable to the fact that under industrial farming conditions (*i.e.* the conditions of actual production in the eastern counties and the United Kingdom generally), rain in late autumn and early winter prevents the sowing of large areas of wheat, the land being sown in spring with oats and barley. This is a factor which must strongly influence Hooker's results, whereas under experimental farming conditions it is inoperative.

The inference that may fairly be drawn from Fisher's most interesting and perhaps not surprising observations is that the conditions of cultivation which apply to Rothamsted experimental plots could not be expected to furnish an entirely trustworthy guide to the yield even of the farms on varying types of soils in the surrounding county; much less to that of the total area of the United Kingdom.

After reviewing the method by which the Lawes and Gilbert estimates were constructed, one cannot hesitate to conclude that,

* "Correlation of the Weather and the Crops" (Statistical Society, 1907), and "The Weather and the Crops in Eastern England, 1885-1921" (Meteorological Society, 1922).

however useful they may have been at the time, their figures did not form trustworthy estimates of the annual yield per acre and total production of the United Kingdom; much less can they be used as criteria with which to test the accuracy of the later official estimates compiled in the manner already described.

Two of the criticisms of the official crop yields are definitely based upon the supposed authoritativeness of the Gilbert and Lawes wheat estimates, viz. :—

- (1) That the English official estimates are unduly conservative because they fail to produce a wheat yield per acre so high as the $38\frac{3}{4}$ bushels over the whole of the United Kingdom estimated by Lawes and Gilbert for 1863.
- (2) That the official estimates are untrustworthy because the average wheat yield per acre does not fluctuate from year to year by the large amounts previously recorded in Lawes' and Gilbert's estimates.

The article says, "It seems incredible that 35.4 bushels in 1921 should represent the modern peak of achievement if 60 years ago an average yield of $28\frac{1}{4}$ bushels was susceptible of increase to nearly 39 bushels. On this basis the present-day level of 31.4 bushels might reasonably be expected to provide examples of over 43 bushels.—Where are they?"

The reply is that the yield per acre given by Lawes and Gilbert for any particular year and the variations from year to year cannot now be accepted with confidence.

The Conditions of English Agriculture from 1885 to 1914.

The article states :—

"In effect the Scottish and Irish Departments had recognised an increase of 25 per cent. on cereal yields in excess of the figures given by Lawes and Gilbert a generation earlier. If no explanation based on agricultural practice or natural phenomena is forthcoming, are we not justified in asking why England failed to register commensurate improvement, and if satisfactory reasons are lacking, may we not suggest that perhaps the figures for English yields are themselves retrograde?"

The article does not state, however, why it is assumed that "no explanation based on agricultural practice or natural phenomena is forthcoming."

Even if we could accept without question the estimates of Lawes and Gilbert and admit that the official records for England since then fail to show so marked an advance for wheat as those of Scotland and Ireland (Lawes and Gilbert did not make their estimates for the

other cereals), the over-ruling factor in a discussion of the question is that at the time of the commencement of the official yields, agriculture in this country had just passed from a time of great prosperity and productiveness to one of increasing depression.

In *English Farming Past and Present* (1912, 4th edition, 1927) Lord Ernle has depicted the progress and prosperity of English farming from 1853 to 1874 in vivid passages. The general level of farming rose rapidly towards the best standard of individual farmers of 1837, and speaking of the "golden age of agriculture" from 1853 to 1874, Lord Ernle says :—

"Crops reached limits which production has never exceeded, and probably, so far as anything certain can be predicted of the unknown, never will exceed."

After 1874 the tide of agricultural prosperity turned and rapidly ebbed. A period of depression began which, with some fluctuations in severity, continued throughout the rest of the reign of Queen Victoria and beyond. Acute crises occurred in agriculture from 1875 to 1884 and again from 1891 to 1899.

Speaking of the earlier crisis, Lord Ernle says :—

"Thrown on their own resources, agriculturists fought the unequal contest with courage and tenacity. But, as time went on, the stress told more and more heavily. . . . Enterprise gradually weakened; landlords lost ability to help; farmers their recuperative power. Prolonged depression checked costly improvements. Drainage was practically discontinued. Both owners and occupiers were engaged in the task of making both ends meet on vanishing incomes. Land deteriorated in condition; less labour was employed; less stock was kept; bills for cake and fertilizers were reduced. The counties which suffered most were the corn-growing districts, in which the high farming had its most signal triumphs."

Comparing the second depression (1891-9) with the first, Lord Ernle states :—

"But the great difference lay in the comparative resources of agriculturists. In 1879 the high condition of the land had supplied farmers with reserves of fertility on which to draw; now, they had been drawn upon to exhaustion. In 1879, again, both landlords and tenants were still possessed of capital; now neither had any money to spend in attempting to adapt their land to new conditions."

Reference might also be made to papers read before the Royal Statistical Society. In 1905 a paper by Sir R. H. Inglis Palgrave on "Estimates of Agricultural Losses in the United Kingdom during the last Thirty Years" describes the depression in figures which

leave no doubt as to its effects upon farming enterprise. The equally unfortunate position of the landowner may be traced in Mr. R. J. Thompson's paper, "An Enquiry into the Rent of Agricultural Land in England and Wales during the Nineteenth Century" (1907).

The census figures of employment in agriculture show such a reduction of labour from 1871 to 1901, that it is a safe conclusion that even after allowing liberally for the advantages of increased use of labour-saving machinery, the heavy decrease in the labour applied to agricultural land between 1871 and 1911 resulted to some extent in a reduction of the intensity of cultivation on much of the area still left under the plough.

Apart from a good many exceptional farmers and the best soils, high farming had become a financial and economic impossibility for the corn-growing districts of England.

In a memorandum by Sir Thomas Middleton appended to the Final Report of the Agricultural Tribunal of Investigation published in 1924 there are some striking passages on the subject of high output per man but low output per acre shown by a type of farming methods "frequently resorted to in English counties before the war."

I may supplement these references by a quotation from a lecture by Professor Sir Rowland Biffen at the East Anglian Institute of Agriculture, Chelmsford, on November 7th, 1927.

Sir Rowland is reported to have said that the average wheat crop per acre was pretty much the same as it was fifty years ago, but he was going to tell them that they did not grow the crops as well as they did fifty years ago. He was pretty sure that if wheat were cultivated as well as it was in the '70's and '80's they would get more than 32 bushels to the acre. The varieties of wheat to-day, however, were distinctly better than they were fifty years ago.

The history of agriculture does, therefore, provide an explanation of any failure of England to register striking improvement in the yields per acre of the principal crops since official estimates were first made in 1884. The surprise is, not that the official estimates for England fail, on the average, to record much higher yields, but that wheat, beans and mangold should actually register definite improvements of yield at all. In view of the changed conditions a decline in the yield per acre since the '60's and '70's might have been expected.

Support of this view is provided, curiously enough, by the author of the article, in his earlier work, *Foundations of Agricultural Economics* (1923). He there reviews (pp. 146-7) the yields of wheat, barley and oats in each decade, 1885-1914, in the eastern

counties of England, and says that "If the improvement in this country was slow, and was mainly confined to a levelling up of the poorer districts, it must not be forgotten that when the statistics of yield were first collected we were far ahead of Europe in this respect, and that it has taken more than a generation for our rivals even to approach our accomplishments of thirty years ago. . . . *As matters were, there is no doubt that the improvement was made in the face of economic difficulties that would, if unresisted, have caused an actual reduction in the rates of yield after 1880.* It may be objected that, if English yields only are investigated the results are not so satisfactory, but the mere fact that the greatest improvements were recorded in those districts that had been the most retrograde is surely sufficient reason for commendation, irrespective of whether they were situated in England, Wales or Scotland."

One should not pass from a review of the conditions of agriculture in England without some reference to the weather conditions as they have affected crop production. Fortunately the necessary analysis has already been undertaken in Hooker's investigations (already quoted) for Eastern England. The period of thirty-seven years (1885-1921) covered by him is nearly the same as the four decades (1885-1924) dealt with in this paper. The broad conclusion to be drawn is that the actual yields recorded for corn, potatoes and roots are in reasonably close agreement with theoretical expectations based upon the most influential weather factors. An interesting point is that in the case of oats there appears to have been a progressive increase of yield which has been masked by the particularly unfavourable weather conditions from 1912-21. In the case of beans, peas and mangold Hooker suggests that certain factors other than those particularly taken into account in his own theoretical calculations, have had greater influence in determining the actual yields.

Hooker also concludes that if one regards the entire vegetable production of the farm as an entity "we may regard the quinquennium 1905-10 as giving a succession of good crops, also 1895-1900, while the intervening period was not bad. The weather conditions of the past seven or eight years (*i.e.* 1914-21) may safely be pronounced to have been very unfavourable."

Hooker's remarks apply particularly to Eastern England, but, as this is the main centre of crop production except as regards hay, they serve as a very fair indication of the main conditions tending to influence the yields of England as a whole, and especially account for the general decline of yields recorded in the fourth decade, in so far as this was not also the result of war-time conditions.

The history, economic and climatic conditions of English agri-

culture seem to me to provide a sound explanation for the very moderate increases which have been recorded in the crop yields since 1885.

The Comparison of English Yields with those of other Countries.

Having cleared the ground to some extent (1) by rebutting such criticisms as are based upon Lawes and Gilbert's estimates, and (2) by showing that general agricultural economic conditions since the "seventies" have not been favourable to increased yields of grain crops, we may now turn to those criticisms of the official estimates based on other considerations.

The present paragraph will examine the facts and conditions of the improved yields recorded for Scotland and Ireland.

(i) *Comparison with Scotland.*

The decennial average yields for Scotland are set out below :—

TABLE III.

| | Wheat | Barley. | Oats. | Beans. | Potatoes. | Turnips, and Swedes. | Mangolds. |
|------------------|----------|----------|---------|---------|-----------|----------------------------|-----------|
| | Bushels. | Bushels. | Bushels | Bushels | Tons. | Tons. | Tons. |
| 1885-94 | 35·3 | 35·3 | 35·6 | 30·5 | 5·6 | 14·9 | 16·2 |
| 1895-1904 | 37·7 | 35·8 | 36·4 | 33·1 | 5·9 | 15·1 | 17·2 |
| 1905-14 | 40·6 | 36·1 | 38·0 | 36·7 | 6·5 | 16·5 | 18·9 |
| 1915-24 | 38·6 | 35·1 | 39·3 | 35·4 | 6·5 | 16·7 | 18·5 |

The article remarks : " If we accept as accurate the statements supplied by the Scottish and Irish Departments—and there is no reason why, merely because they differ from those relating to England, we should treat their crop reporting system as suspect or their personnel as inefficient. . . . "

From 1885 to 1911 the Scottish returns were collected by the same Department as the English returns, by reporters of the same type as the English, appointed in the same manner, and proceeding under the same instructions. Since 1912, so far as I am aware, the Scottish Board have made no alteration in the type of personnel of their reporters or in their general instructions to cause them to differ from those of England.

Consequently there can be no question of regarding the Scottish system as more or less trustworthy than that of England. The reason for the differing trend of yields in Scotland, particularly for oats, turnips and potatoes, must accordingly be sought elsewhere.

An important feature of Scottish farming from 1885 to 1914 is the much smaller reduction of the arable area than in England.

In Scotland the arable area fell from 3,626,000 acres to 3,295,000 acres—a decrease of 331,000 acres, or only 9 per cent. In England, however, the arable area declined from 12,650,000 acres to 10,306,000 acres—a decrease of 2,344,000 acres, or 18½ per cent. Between 1885 and 1914 there was no alteration of significance (actually a small increase) in the numbers of horses, cattle and sheep on farms in Scotland, whereas in England the numbers of horses and sheep fell markedly, and the numbers of cattle increased markedly with the increase of area under permanent grass.

The difference shown by these figures between England and Scotland appears to be explained largely by the fact that Scottish farmers have been very much less dependent upon sales of their corn crops for their prosperity than were the farmers of the wide corn-growing areas of England. For this reason the high farming system of the "seventies" and "eighties" continued substantially less affected in Scotland than in England up to 1914, and such improvements of agricultural practice as have appeared desirable have left their effect on the crop yields. I am informed that the period under review has seen definite improvements in the manuring of all crops. In the case of oats, however, the improved yields may be attributed largely to the importation of heavier cropping varieties of seed, mainly from Sweden and Canada, combined with improved manuring. In the case of roots and potatoes the heavier yields may be attributed mostly to the improved application of fertilisers, a practice that probably reacts beneficially upon the crops of wheat and barley, which are usually grown after roots in the rotation.

Dr. A. E. M. Geddes, in his paper on "The Weather and Crop Yields in the North-East Counties of Scotland" (Royal Meteorological Society, 1922), also refers to the improved methods of cultivation of oats, turnips and potatoes. It would also appear from Geddes' paper that root crops grown in Eastern Scotland are less affected by variations of weather from the normal, season by season, than are similar crops grown, for example, in Eastern England; in other words, Eastern Scotland apparently offers consistently favourable weather conditions for the production of turnips; this fact, coupled with the fact that the chief saleable products, Scottish beef and mutton, have consistently commanded the highest prices in British markets, seems to supply every incentive to continue high farming and to apply the most improved methods to the production of the root and oat crops that are grown as fodder for farm stock.

As the article suggests that there is a lack of responsiveness to facts on the part of the English as compared with the Scottish crop reporters, the following table gives the average variations of

the yields of the chief crops in England and Scotland respectively, in two periods, (a) 1886-1905 and (b) 1906-25.

TABLE IV.
(a) 1886-1905.

| | Wheat. | Barley. | Oats. | Potatoes. | Mangolds. | Turnips. |
|-----------------|----------|----------|----------|-----------|-----------|----------|
| | Bushels. | Bushels. | Bushels. | Tons. | Tons. | Tons. |
| England | 2.3 | 1.6 | 2.2 | 0.4 | 1.5 | 1.4 |
| Scotland | 1.9 | 1.1 | 1.1 | 0.7 | 1.5 | 1.1 |

(b) 1906-1925.

| | Wheat. | Barley. | Oats. | Potatoes. | Mangolds. | Turnips. |
|-----------------|----------|----------|----------|-----------|-----------|----------|
| | Bushels. | Bushels. | Bushels. | Tons. | Tons. | Tons. |
| England | 1.6 | 1.6 | 2.1 | 0.5 | 1.4 | 1.4 |
| Scotland | 1.4 | 1.45 | 1.45 | 0.6 | 1.7 | 1.2 |

The table shows (i) that for every crop excepting potatoes and mangolds, the English reporters show a larger average variation than do the Scottish, and (ii) that the variation in England is not significantly less in the later than in the earlier period, except for wheat, which shows less variation in both countries in the later period.

In "Correlation of the Weather and the Crops" (Royal Statistical Society, 1907) Hooker found distinctly greater variability of all crop yields excepting potatoes, but including beans, peas and hay, in Eastern England than in Scotland. The explanation of this different range of variation is probably that crop yields in Scotland are, in fact, less affected by variations of weather from the normal than are English yields. In the case of turnips Geddes (already quoted) seems to have definitely established this explanation.

(ii) *Comparison with Ireland.*

The yields of crops taken from the Irish official statistics are as follows:—

TABLE V.

| | Wheat. | Barley. | Oats. | Beans. | Potatoes. | Turnips. | Mangolds. |
|------------------|----------|----------|----------|----------|-----------|----------|-----------|
| | Bushels. | Bushels. | Bushels. | Bushels. | Tons. | Tons. | Tons. |
| 1885-94 | 29.1 | 36.4 | 41.0 | 34.3 | 3.5 | 13.1 | 14.0 |
| 1895-1904 | 32.6 | 38.8 | 44.7 | 37.5 | 4.0 | 15.3 | 16.5 |
| 1905-14 | 36.9 | 43.0 | 49.5 | 45.3 | 5.2 | 17.2 | 19.4 |
| 1915-24 | 35.2 | 36.8 | 45.7 | — | 4.9 | 15.7 | 18.0 |

The figures all show marked increases from the earliest period to the third period, but a general and very significant decrease in the fourth period. The increases have been taken as evidence of the greater accuracy of the Irish estimates as compared with the English estimates, because the latter fail to record similar notable increases (except for wheat and beans) between the first and third periods.

It has already been pointed out that the "seventies" in England were a period of high farming in which maximum yields were sought without stinting expenditure in their production, and that there is no reason to look for higher yields subsequently up to 1914 (apart from the influence of better weather conditions).

This was not the case in Ireland. Reference should be made to the reports of the Assistant Commissioners presented in 1880 to the Royal Commission on the depressed state of agriculture in the United Kingdom (1879), which paint the condition of cultivation in Ireland in the most depressing colours. The phrase occurs in relation to parts of Connaught and Ulster:—"The land is as a rule not yielding one-half the produce which it could under proper cultivation," and "... the soil of Ireland, more especially in the south and west, is not well cultivated. One of us has often exposed the defects of Irish farming. They need not be repeated in this place."

The condition of things there revealed of the state of Irish farming in large areas of the country in 1879-80 is in striking contrast to the practice of English farming at that time, and one would be bound to admit that it would be a tragic commentary on the earnest and persistent efforts which have been made to improve the condition of Irish agriculture during the past half-century if the crop yields of the country failed to show a substantial increase over those returned in the "seventies" and "eighties."

To use the records of improved yields in Irish agriculture to call in question the records for English agriculture can hardly be justified.

(iii) *Comparison with Continental Crops.*

The yields of cereals for the ten years 1910-19 are quoted in the article for the purpose of comparing variations of British and Continental yields. In five of the ten years the crops were grown under the stress of war conditions, and while abnormal conditions prevailed in the British Isles, the conditions in Germany (one of the countries selected) and the neutral countries of Western Europe were all equally if not more disturbed by the stress of the Allied Blockade.

Any conclusions based on international comparisons during this period seem to be of little value, but so far as they go the three

countries, England, Scotland and Ireland (and not England only), all show much less annual variation of yields than is found in the Continental countries.

The Alleged Chronological and Geographical Anomalies in the Official Produce Returns.

The article makes the following statements on the above subject :—

“Individual counties exhibit wide divergences from the common level of their circumscribing neighbours,” and “These divergences can be proved to be unrelated to any such causatives as geological formation or soil conditions.”

In the second of these statements one is being asked to accept too much without reference to evidence. During the whole period specially reviewed, *i.e.* 1885–1914, English agriculture was in process of change; indeed the change began long before. Arable areas were steadily and seriously reduced over the whole of the country, and the permanent grass area was correspondingly increased, but the changes were far more pronounced in some districts than in others. Selection of soils, whether made skilfully or unskilfully, was in process. Moreover, the selection was not based purely on relative fertility as evidenced by cropping powers. The author of the article refers to the oft-quoted economic theory that when areas under a crop have been reduced it is the most fertile land which is retained, without also referring to the important limitations to which the theory is known to be subject.

The author has also referred to this theory in *Foundations of Agricultural Economics* (p. 147). There, after noting with satisfaction the improved yields of wheat and barley in Eastern England between 1885 and 1914, he states that “when the acreage under these crops (wheat and barley) shrinks, the poorer land is always the first to be put under alternative crops, and in each individual district the best land is reserved for the most important cereals”; the only limitation to this rule which he admits is the case of heavy clay-lands.

In his Report as a member of the Agricultural Tribunal of Investigation (1924) Professor D. H. Macgregor remarks (p. 152): “The problem of average yield in relation to area and to changes in area is a complex one, depending both on the gradient of fertility and on the gradient of cost. The land which is first lost to a crop is not necessarily that with the lowest yield, but that with the lowest yield in relation to the cost. It could not be said that all the wheat land lost to Britain had lower yields than all that which remains under the plough.”

In a paper on “The Increased Yield per Acre of Wheat in

England considered in Relation to the Reduction of the Area," (Royal Statistical Society, 1910), I concluded, on the statistics for 1885 to 1908. that :—

- (1) The reduction of the wheat area had been accompanied by a rise of the yield per acre of England as a whole.
- (2) The yields of separate counties had shown a slight tendency to level up.
- (3) Counties of low yields did not appear to have been specially selected for a marked reduction of area.
- (4) Improvements in the yields appeared to some extent to be greatest in those counties where the proportionate reductions of area had been greatest.

These conclusions covered only a small part of the problem of soil selection, but they appear to me to be very suggestive. It is necessary to know what types of soil have been withdrawn from different classes of cropping, and the effect, if any, of such withdrawal upon average yield. In comparing the yield of a crop on 70,000 acres in a county in the earliest period with the yield of the same crop on, say, 40,000 acres in the same county twenty years later we are not necessarily comparing like with like.

Another factor which has to be taken into account is the relative importance of different crops in the farming economy at different periods of this time of change. It is not an unreasonable assumption that, if in some counties there is very marked evidence of the concentration of cropping upon other crops at the expense of wheat and barley, the latter were considered relatively less attractive financially (whether directly in cash or indirectly matters not), and probably received less attention in the matter of cultivation for high output.

A further factor which the article does not take into proper account is the influence of the weather as the prime causative of local and general seasonal variations in crop yields; Hooker's investigations showed that this influence is not necessarily eliminated by taking decennial averages.

It would be lengthening this paper unduly to give the results of my examination of the many instances of "anomalies" put forward in the article, but I have in an Appendix quoted and commented upon two such instances which seem to give point to the general observations already made, and to indicate a certain want of accuracy in some of the statements found in the article. Careful examination of most of the other instances of alleged "anomalies" has led me to the conclusion that the figures quoted do not bear the anomalous character suggested in the article.

The Alleged Tendency towards Uniformity.

In the conclusion of the paragraph (pp. 407-9) dealing with alleged anomalies of a chronological and geographical nature, the article observes :—

“ The tendency towards uniformity in the annual reports of each separate county has been progressive, for up to some twenty years ago yields much in excess of the normal were frequently in evidence. Thus in 1902 the oat crop was affected to the following extent : in Dorset (ten-year average, 39·8 bushels) the yield was given as 56·72 bushels, in Cornwall (ten-year average, 38·41 bushels) as 48·13, and in Cumberland (ten-year average, 41·40 bushels) as 49·30 bushels. *Nowadays the average in these counties is practically the same, but excesses of such dimensions are unknown.*”

Figures have already been given in the paragraph dealing with Scottish yields showing that the average variation of yields of most crops for England as a whole is not significantly different in the period 1906-25 from the average variation in the period 1886-1905. It may be added that the record yields since 1885 for every crop, other than hay and hops, have all been returned in the last two of the four decades under review. In three cases (wheat, potatoes and mangolds) the record was actually established in the fourth decade. This can hardly be regarded as evidence of increasing conservation and tendency towards uniformity in the minds of the reporters during the second 20 years.

The last sentence (italicised above) seems to ask, as a test of the trustworthiness of the English yields, that individual counties which in specially favourable seasons were able to show record yields shall certainly reproduce those records within a given period.

If so, the demand is hardly reasonable; but if the more reasonable suggestion is made that ranges of yield of oats of the amplitude illustrated by the cases cited for 1902 are now unknown, it is perfectly easy to show that the suggestion is the reverse of the facts.

In 1902, the year quoted, the general yield of oats was unusually good, being the heaviest returned since produce returns were first collected in 1884; large excesses over the ten-year average were naturally to be expected in that year. Five years later, in 1907, a higher yield, the heaviest which has yet been reported, was obtained. In 1926 another heavy crop, only exceeded by that of 1907, was harvested. The returns of 1926 were not available when the article was written; I have, therefore, taken a fourth year, 1924, when a crop moderately over the average was harvested.

For each of these four years the following table gives ten counties

showing the greatest excesses over the ten-year average yield per acre, with the amount of such excesses.

TABLE VI.
OATS IN ENGLAND.

Ten counties in which the yield per acre gave largest excesses over the ten-year county average.

| County. | 1902. | County. | 1907. | County. | 1921.* | County. | 1926.* |
|---------------------------|---------|--------------------------------|----------|----------------------|----------|-----------------|----------|
| | Bushels | | Bushels. | | Bushels. | | Bushels. |
| Dorset ... | 16.9 | Middlesex ... | 16.5 | Dorset ... | 14.9 | Middlesex ... | 16.9 |
| Devon ... | 10.8 | Cambridge (inc. I. of Ely) ... | 11.0 | I. of Ely ... | 10.9 | Salop ... | 15.5 |
| Cornwall ... | 9.7 | Dorset ... | 12.9 | Lincoln (Kest.) ... | 10.3 | Norfolk ... | 11.8 |
| Oxford ... | 9.6 | Rutland ... | 12.4 | S. of Peterboro' ... | 10.1 | Yorks, W.R. ... | 11.5 |
| Wilts ... | 9.1 | Notts ... | 11.5 | Stafford ... | 9.8 | Stafford ... | 11.5 |
| Northants (inc. Soke) ... | 8.2 | Lincoln ... | 10.4 | Nottingham ... | 9.5 | Gloucester ... | 11.2 |
| Suffolk ... | 8.0 | Gloucester ... | 10.2 | Yorks, W.R. ... | 8.6 | Sussex, W. ... | 10.9 |
| Sussex ... | 8.0 | Wilts ... | 10.3 | Hampshire ... | 8.3 | Warwick ... | 10.6 |
| Cumberland ... | 7.9 | Surrey ... | 10.0 | Norfolk ... | 7.5 | Somerset ... | 10.3 |
| Norfolk ... | 7.1 | Northants (inc. Soke) ... | 9.1 | Warwick ... | 7.5 | Oxon ... | 10.1 |
| Average excess | 9.6 | Average excess | 11.7 | Average excess | 9.8 | Average excess | 12.0 |

* The yields for 1924 and 1926 were published in cwt.s., and the excesses have accordingly been converted to bushels at 39 lbs. per bushel.

This table shows conclusively that in the very year in which the article was published a crop was harvested in which the yields of individual counties exceeded their ten-year averages by amounts definitely larger than the excesses of 1902 and even larger than those of 1907, which is still the record year for oats. Even in 1924, a year of lower average yield than 1902 by 6 bushels, the excess yields of ten individual counties were slightly greater than those of 1902.

TABLE VII.
WHEAT IN ENGLAND.

Ten counties in which the yield per acre gave largest excesses over the previous ten-year county average.

| County. | 1898. | County. | 1921. |
|----------------|----------|--------------------------------|---------|
| | Bushels. | | Bushels |
| Wilts ... | 7.8 | Lincoln ... | 8.6 |
| Hants ... | 7.5 | Cambridge (inc. I. of Ely) ... | 8.3 |
| Cornwall ... | 7.4 | Huntingdon ... | 8.1 |
| Hereford ... | 7.3 | Wilts ... | 7.7 |
| Oxford ... | 7.1 | Berks ... | 7.3 |
| Suffolk ... | 7.1 | Hants ... | 7.2 |
| Devon ... | 7.1 | Bucks ... | 6.9 |
| Essex ... | 7.0 | Suffolk ... | 6.7 |
| Lancs ... | 6.9 | Cornwall ... | 6.6 |
| Durham ... | 6.9 | Dorset ... | 5.9 |
| Average excess | 7.2 | Average excess | 7.3 |

The wheat crop supplies similar evidence. The highest crop on record in the earlier period was that of 1898, which is presumably well before the time by which the judgment of the crop reporters is supposed to have become partially paralysed, and the crop of 1898 has only been surpassed by the recent crop of 1921.

Table VII gives the ten counties in each year where the yield most exceeded the previous ten-year average.

Here we see the wheat yields of individual counties showing in 1921 excesses over their ten-year averages as large as or larger than any in 1898.

Another crop deserving of similar comparison is potatoes; the highest yield ever recorded is that of 1922, and the highest of the earlier period is that of 1895. The figures are as follows:—

TABLE VIII.
POTATOES IN ENGLAND.

Ten counties in which the yield per acre gave largest excesses over the previous ten-year county average.

| County. | 1895. | County. | 1922. |
|-----------------------|-------|---------------------------|-------|
| | Tons. | | Tons. |
| Cornwall | 2.6 | Berks | 3.0 |
| Wilts | 2.5 | Holland (Lincs) | 2.4 |
| Huntingdon | 2.3 | Kesteven (Lincs) | 2.2 |
| Dorset | 2.2 | Isle of Ely | 2.1 |
| Somerset | 2.1 | Norfolk | 2.0 |
| Bedford | 1.8 | Soke of Peterboro' | 1.9 |
| Devon | 1.8 | Oxford | 1.8 |
| Hertford | 1.8 | Huntingdon | 1.8 |
| Northants | 1.7 | Buckingham | 1.7 |
| Derby | 1.6 | Worcester | 1.7 |
| Average excess | 2.0 | Average excess | 2.1 |

It would be very easy to extend this sort of enquiry over other crops, but enough evidence has, it is suggested, been produced to rebut the unsupported assertion that "the tendency towards uniformity in the annual reports of each separate county has been progressive, for up to twenty years ago yields much in excess of the normal were frequently in evidence."

The following reference to the crop reporters was made in the article (p. 407):—

"These persons have, in the majority of instances, acted for many years, and there is little doubt that their views have become stereotyped and their estimates refuse recognition to modern developments."

As a matter of fact, the personnel engaged is constantly changing owing to retirements, deaths, etc. Thus between 1905, when the

crop reporters came under direct appointment of the Board of Agriculture and Fisheries, and 1919 four-fifths of the personnel was changed. In 1919 the numbers were raised from 220 to about 320, and new reporters were appointed in respect of just over half of the crop-reporting districts of England. Furthermore, out of the 320 crop reporters who were employed in 1919, only 204 remain at the end of 1927. There is thus nothing static or permanent about the staff employed, and no foundation for the statement that "these persons have *in the majority of instances acted for many years.*" Abundance of "fresh blood" has been brought into the reporting service at different times, and all the time the standard of competence and experience required for new appointments has been steadily rising.

The Allegation that the Official Estimates "Refuse Recognition to the Plant Breeder."

On this point it is alleged that although new varieties of wheat have been introduced into the east of England, and are widely cultivated, the returns for nine counties in this area show "a decline in every instance ranging from two bushels per acre, for the latest available ten-year average, compared with that of the period 1905-14; if every allowance be made for war and post-war conditions, the results are still difficult of acceptance. . . . The official statistics do not deny a substantial increase in the productivity of the western, the northern and the Welsh districts—especially remarkable are those found in Northumberland, Durham, Devonshire and North Wales—but such increase has little effect on the average yield applicable to the whole of England. . . ."

It is here admitted that the crop reporters of the western and northern districts of England and of Wales have recorded heavier yields, and criticism is specially directed against the reporters in the eastern counties of England because, although living in the midst of important corn-growing areas, and mixing constantly, one may say daily, with farmers who are growing the new varieties, seeing their crops and discussing yields with them, they record definitely lower average wheat yields for the decade 1915-24 than for the decade 1905-14!

It is said that "if every allowance be made for war and post-war conditions the results are still difficult of acceptance"; but surely if the reporters of nine different counties, numbering some 50 persons, reporting the separate yields of some 2,720 individual parishes, show consistently lower average wheat yields in the fourth decade, there may be some reason other than the supposed paralysis of their judgment, *especially as 66 per cent. of them were new appoint-*

ments after 1918! Moreover, in 1921 they assisted to return the highest wheat crop ever recorded!

The article shows no evidence of any investigation of the *weather conditions* as they affected the wheat crops in each of the two decades, while the effect of the sudden wide extension of the arable area during the war, without an increase of the labour force or in face of actual depletion, and in face of difficulties in relation to the supply of fertilisers, is lightly dismissed. Not only Eastern England, but Scotland and Ireland also show a lower wheat yield for the decade 1915–24; the reasons may not be identical for each country, but it cannot be said that Eastern England stands alone in this respect.

It is interesting to note, therefore, that the independent estimates published in *The Times* newspaper exhibit the same characteristic as the official estimates, as will be seen from the following table:—

TABLE IX.

| | Official Estimates (bushels). | | <i>The Times</i> Estimates (bushels). | |
|--------------------------------|----------------------------------|---|--|---|
| | England. | Eastern and North-eastern Counties. | England. | Eastern and North-eastern Counties. |
| 1905–14 | 32.1 | 32.8 | 33.2 | 33.6 |
| 1915–24 | 31.1 | 31.9 | 32.1 | 32.5 |
| Reduction in second decade ... | 1.0 | 0.9 | 1.1 | 1.1 |
| Reduction per cent. | 3.1 | 2.7 | 3.3 | 3.3 |

The independent *Times* estimates show reductions slightly exceeding those of the official estimates, and thus fail to support the criticism put forward in the article.

An extraordinarily interesting and independent comment upon the official wheat estimates of three years in the decade 1915–24 was made in the First Report of the Royal Commission on Wheat Supplies (1921) (Appendix 15, p. 41). With precise and authoritative information available, as the result of Government control of flour mills, they found that the quantity of home-grown wheat milled in 1917–18, 1918–19 and 1919–20, averaged less than 66 per cent. of the estimated crops of 1917, 1918 and 1919. The low proportion was surprising, having regard to the attractive prices then ruling for wheat and to the definite prohibition then in force against the use of sound wheat for any purpose but seed and milling. The Commissioners, without coming to a definite conclusion, suggested as one possibility that

there might have been an *over-estimate* made of the crops harvested in these years. This suggestion is the more remarkable because the official wheat yields for England were *under-average* for 1917 and 1919, and *over-average* for 1918 only.

The outstanding varieties of wheat introduced to English farmers as the result of the research and experiments of the Cambridge Plant Breeding Institute are known as Little Joss, Yeoman I and Yeoman II. Little Joss was introduced shortly before the war as a new rust-resisting variety which, it was claimed, outcropped the well-known and widely grown variety Square Head's Master. This variety is now extensively grown in East Anglia.

Yeoman wheat was introduced first in 1916 as a new variety giving heavy yields under proper treatment, capable of standing up well in bad weather, its outstanding characteristic being that it produces flour of strength much superior to that of any other English wheat. The general consensus of opinion is that Yeoman is a typically heavy-land wheat; on the lighter soils, particularly in Norfolk, it is often outyielded by Little Joss. Yeoman I does not appear to have been grown extensively until after the war, and an improved variety, Yeoman II, stronger and better than Yeoman I, was produced, and first introduced for general distribution among farmers for the season 1924-25, *i.e.* the year following the fourth decade dealt with in this paper.

Yeoman wheat is now being grown continuously on an extensive scale not only in the eastern counties,* but also in other districts of England, and the results of these trials will be of the greatest interest, because, if continued over a sufficient term of years, they should thoroughly test the new wheats not only in the hands of the most progressive and skilful farmers, but also in the hands of the average farmer to whom Biffen and Engledow refer when they say in their monograph on "Wheat Breeding Investigations at the Plant Breeding Institute, Cambridge":—

"A far larger yield than 32 bushels is clearly possible *with existing forms of wheat* if the grower will but set himself the task of producing it. . . . The demand is really for new wheats which cannot help cropping however much the grower leaves undone."

It is, of course, not enough to know that the new wheats are giving heavy yields in the hands of a comparatively small number of the best cultivators who have always grown heavy crops on highly farmed lands. One must also know that the average farmer,

* Some official data as to the area under different varieties of wheat in Eastern England are published in Part I of Agricultural Statistics, 1925.

on every type of soil, subject to favourable and unfavourable weather, treating the new wheats to much the same selection for seed and cultivation as he has been accustomed to give to good varieties of the older wheats, is obtaining an appreciable increase of yield.

Opinions have been expressed and estimates made by plant breeders and others as to the improvement in crop yields already secured from the introduction of the new varieties, but I am informed after very careful enquiry that no reliable data have been published dealing with the yields of the new varieties as compared with the old when grown by ordinary farmers over wide and varying areas and under every variety of weather conditions.

Whilst the possibility of increased yields from the introduction of new varieties is not denied, the position is that there is no evidence to justify the assumption made in the article that it had actually taken place on such a scale as to raise average yields over the decade 1915-24.

“The Times” Crop Estimates.

We are told, concerning the official yields, that—

“If placed side by side with an alternative series (*The Times* estimates) compounded on similar methods by more numerous local observers, they fall systematically below it, crop by crop, county by county, year by year.”

Without detracting in any way from the value of *The Times* estimates in comparing variations of yield from year to year, it is necessary to observe that the methods adopted, though sufficiently exact for this purpose, are not, in fact, so thorough or so exhaustive as the official system, nor is there any evidence that the number of local observers is more numerous.

I must again emphasize the point that the official crop reporters, about 320 since 1918 and originally about 220, do not, and never did, rely solely on their own judgment in assessing the average yield of each crop in their area. In the very first year, 1884, in which the produce returns were collected, the official report stated that “in some cases estimators report that from 100 to 350 replies to circulars which they had addressed to surrounding agriculturists for the purpose of verifying the conclusions arrived at have been received, while various owners or persons in charge of travelling threshing machines were also applied to for the same purpose.” From that time until the present the crop reporters have continued to seek and to receive the assistance of numerous agriculturists, and, while no figures are available, many thousands of individuals throughout the country do actually render this assistance.* The

* An estimate, which I give with reserve, is that over 10,000 persons regularly assist.

number of observers who supply information to *The Times* appears at present to be about 300, and no doubt they collect opinions in the same way from many sources, but that they do so to so large an extent may be doubted.

So far as is known, *The Times* does not make estimates parish by parish, nor weight its observers' figures by the area of the crop in the district covered by each observer. In fact *The Times* average for England (but not for Great Britain) is a simple arithmetical average of the yields of each county, irrespective of the area under the crop in each county. The article (p. 399) does not attach importance to the weighting of yields by areas, but if official data be accepted as a guide, the absence of weighting may tend to produce misleading averages for the individual counties as well as for the separate divisions and countries.

A material difference between *The Times* procedure and that of the Ministry is that the former's estimates are made up as at the 1st October and are summarized and published in *The Times* in the first half of October; the official crop reporters, however, have not, in the past, furnished their parish estimates until the 15th October in the case of corn crops and until the 15th November in the case of potatoes and roots. The official reporters are in a position to collect by 15th October a greater number of threshing results than can be collected by 1st October by *The Times* observers. In relation to potatoes and roots the official reporters have the advantage of an extra six weeks over *The Times* observers, whose estimates for the root crops on 1st October necessarily contain a large element of forecast. This difference alone must obviously enhance the accuracy of the crop reporters' estimates.*

The article lays stress upon the fact that the official estimates when compared with *The Times* estimates fall systematically below the latter, crop by crop, county by county, year by year. This is frequently but not invariably the case. What then may be the explanation?

The explanation which seems to me inevitable is that *the yields recorded by the two series of estimates do not, in fact, relate to exactly the same "material."* *The Times* reporters, being drawn largely from the ranks of the best type of farmers (they are described as "eminent and experienced agriculturists"), would probably, as the result of the more limited scope of their investigations, tend to return much more nearly what they themselves produce on their own farms, which *ex hypothesi* are among the better cultivated. "*The Times* " yields should, I think, be regarded as representative

* In future official estimates of corn crops will be made up one month later, i.e., 15th November.

of a rather better type of farming than the average of the country. This conclusion should not, however, seriously invalidate the value of *The Times* records (if properly weighted) in comparing one year with another, but they can hardly be regarded as so completely representative of the whole of the country as the official estimates which minutely cover the whole of the area under each crop.

The Alleged Depressing Influence of Crop Forecasting.

The article states that "there is a possibility that the practice of crop forecasting, as carried out during the past twenty years, has made its depressing influence felt" upon the official estimates. This criticism has been amplified by Mr. Venn in a second article, "Crop Forecasting in England" contributed to the *Economic Journal* in September, 1927, where he maintains that the crop reporters have forecasted under average yields so frequently that the yields ultimately reported by them must be tending downwards as the result of conservatism and bias, and not as the result of facts at harvest time. "Reporters are bound to be affected by their previous forecasts, and hence reluctant to acknowledge improvement."

The fact is that the forecasts and the final estimates are strictly independent enquiries, the yield estimates being much more exhaustive than the forecasts can possibly be. The yields are estimated parish by parish; but in the forecasts the reporter estimates the yield for each crop for the whole of his district in terms of a percentage of the average. It is almost impossible for there to be any connection between the two, as the reporter could not without very great labour know how the separate estimates of parishes would compare with his previous percentage for the whole area. In the final yields attention is paid strictly to facts; the reporters are not asked nor expected to justify earlier opinions. The results show that they very frequently return yields definitely superior to their previous forecasts. There is, in fact, no evidence for the assertion made, which seems to rest on a wholly unjustifiable assumption.

The criticism might have had some weight if the author had produced some independent data. The independent estimates of *The Times* are available for the three cereals and may be compared with the official estimates.

It should be remembered that the official averages are weighted averages and those of *The Times* are not; but this would not affect the comparability of each series with itself.

It will be seen that, in every case, the independent *Times* estimates show a greater reduction of yield in the second decade than the official estimates, and thus entirely fail to support the criticism that the official yields of the second period have tended downwards

unduly, owing to "the depressing influence" of the official crop forecasts.

TABLE X.

| England. | Official Estimates. | | | The Times Estimates. | | |
|----------------------------|---------------------|---------------------|-------------------|----------------------|---------------------|-------------------|
| | Wheat. Bushels. | Barley. Bushels. | Oats. Bushels. | Wheat. Bushels. | Barley. Bushels. | Oats. Bushels. |
| 1906-15 | 32.0 | 32.9 | 40.9 | 33.1 | 34.8 | 44.4 |
| 1916-25 | 31.2 | 30.8 | 39.3 | 32.0 | 32.6 | 42.1 |
| Reduction in second decade | 0.8 | 2.1 | 1.6 | 1.1 | 2.2 | 2.3 |

One may fairly conclude, from Hooker's investigations (already quoted), that the general reduction of crop yields in the last decade seems to be mainly attributable to a succession of seasons of very unfavourable weather conditions, following a decade of generally favourable seasons. One must also allow for the difficulties created by war-time conditions.

Summary of Conclusions.

(1) The history of agriculture in England since 1885 does not justify the expectation of notable advances in the recorded yields of crops; nor has there been evidence advanced for expecting before 1924 any striking advance in the English yields owing to the work of the plant breeders in connection with varieties of wheat. The contention that the official English estimates are untrustworthy or retrograde because they fail to record a general improvement since 1885 does not appear to be justified.

(2) The yearly wheat yield estimates of Lawes and Gilbert prior to 1885 are not trustworthy for their own period, and cannot be properly used as criteria for judging the official produce returns since 1885.

(3) The official estimates are based on the separate yields of some 13,000 parishes, furnished after harvest by crop reporters of recognized standing, competence and experience, with the collaboration of thousands of agriculturists; there have been frequent changes of personnel, and abundance of fresh blood has been introduced to the work since 1905.

(4) *The Times* estimates appear to be compiled from data less extensive and less thorough in origin, and are made up earlier each year than the official records; the general similarity in the movements of *The Times* estimates and the official estimates for England, for the two decades for which the former are available, is none the less very striking.

(5) The evidence does not justify the statements that the official

estimates fail adequately to recognize heavy crops either in individual counties or in England as a whole, or to give proper expression to the character of the season, or that there has been any tendency to uniformity in the reports.

(6) Independent evidence does not justify the contention that official yields have in recent years been biassed and *unduly* depressed as the result of the system of forecasting.

(7) It is not suggested that the English official system of crop estimates has attained perfection; there must always be a striving after greater and yet greater certainty. Nor is it claimed that the system may not give occasional errors of over-estimation as well as of under-estimation. The data and arguments put forward in the article of September, 1926, when subjected to critical examination, seem to me to fail entirely to justify the contention that the official English yields are consistently under-estimated. From a statistical point of view this could only be the case if there were a permanent bias in one direction. There is no evidence that this is the case, nor is there any reason known for its existence. In so far as there has been any decline in the average yield of crops in the last decade (1915–24), the explanation must be sought in such natural causes as the weather and in the disturbing effects of war-time conditions.

APPENDIX.

Note on two instances of alleged "anomalies" in the records of neighbouring counties.

(1) The article states :—" In Nottinghamshire the yield of wheat in 1885–94 was 28·72 bushels, in 1895–1904 was 27·97 bushels, in 1905–14 was 30·67 bushels; as the acreage declined steadily during the three decades, according to official expectations yields should have improved throughout the period."

Comment :—*The wheat area in Notts did not decline steadily during the three decades ; it fell from 52,600 acres (1885) to 30,100 acres (1895), then rose to 43,800 acres (1898) and fell again to 30,100 acres in 1904. From 1905 to 1914 the acreage has ranged around an average of 36,600 acres as compared with 36,400 for 1895 to 1904. There is no justification in the economics of agriculture or in statistical theory for selecting one or more counties in England where wheat areas may have declined and maintaining that, ipso facto, the yield ought to show an increase, and that if such increase is not shown, the yield estimate is anomalous and untrustworthy.*

(2) The article states :—" In Northamptonshire the wheat yields were 31·16, 31·65 and 34·09 on an area which moved uniformly downwards, and in Huntingdonshire corresponding figures were

29·21, 30·11 and 28·60 on an almost stationary acreage—in both counties heavy land predominates.”

“The yield of *oats* declined heavily (43·98, 41·87, 36·13) on a slightly rising area in Huntingdonshire, while simultaneously it fell in Northamptonshire from 38·68 to 36·37, and then rose to 40·05; again, in Hunts, barley yielded 30·30 bushels in the first period on 21,000 acres, 29·20 bushels on 19,000 acres in the second, and 28·85 bushels in the third on a similar acreage, at a time when the Northants figures were 33·38, 30·99 and 35·12, and those of Rutland 32·16, 29·03 and 35·04.”

Comment :—*The wheat area of Northants did not move uniformly downwards* ; for the first decade it averaged 53,400 acres, for the second decade 42,200 acres, and for the third decade 44,800 acres.

The wheat acreage of Huntingdon was not almost stationary ; for the first decade, 36,000 acres, for the second 29,900 acres (a reduction nearly as large relatively as in Northants), and for the third decade 33,900 acres (a greater increase, absolutely and relatively, than in Northants).

Northants is a large pastoral county (two-thirds of the farmed area being permanent grass); Huntingdon is three-fifths arable; there is *prima facie* no reason for expecting agricultural seasons and yields to move uniformly in these two counties, any more than that there should be exactly comparable changes in the acreage under wheat or any other crop.

Between 1885 and 1914 the arable area of Northants was reduced 25 per cent., but in Huntingdon the difference was 16 per cent. In Northants and Huntingdon horses and cattle maintained their numbers, but sheep fell in the former 22 per cent. and in the latter *over 50 per cent.*, although in Huntingdon there was a less pronounced change of the arable area. The Huntingdon acreage figures are interesting because there is a very large proportion of heavy clay land in this county, in fact there is a larger proportion of clay land than in Northants. The Huntingdon clays were not, generally, withdrawn from tillage, but, as Sir Rider Haggard found (*Rural England*, Vol. II, 1902), they fell into a very low state of cultivation. Of the district, mostly heavy clay, between Cambridge and Sandy in Bedfordshire, Sir Rider Haggard was told: “Thousands of acres round here are quite or very nearly derelict, and the farmhouses, buildings and cottages are slowly rotting down. . . . All this land was cultivated and grew good crops in the ‘eighties.’ Here and there are cases that show what the land was—and is.”

It seems clear, therefore, that Huntingdon cannot be properly compared with Northants, where only the more attractive soils have been retained under corn.

DISCUSSION ON MR. VIGOR'S PAPER.

SIR HENRY REW: I rise with very much pleasure to propose a vote of thanks to the reader of the paper. Before doing so, I should like to refer to a note which has been placed in my hand from Major Craigie, who will be remembered by many of the older members of the Society. He did much work for the Society and is famous for his work at the Ministry of Agriculture. A proof of the paper was sent to him, but he regrets that owing to his ill-health and failing eyesight he has not been able to read it thoroughly, nor has he been able, as I had hoped, to send any observations upon it.

I congratulate Mr. Vigor on what I venture to think is a very sound piece of work. I congratulate the Society also in having accepted a paper on this subject, which in my view might have been more discussed in the past than it has been. Mr. Vigor says that the subject has not been brought before the Society since official produce returns have been collected. I am very glad that it has now been introduced, and, judging from the interest that has been aroused, I think we may look for a useful discussion.

Of course I am one of the incriminated persons, but I should like to say at once that I read Mr. Venn's articles with great interest, and I welcomed them. The tone of the articles showed an appreciation of the difficulties of the subject and an attempt, at any rate, to throw light on the principles of crop estimating. I think Mr. Venn had a *prima facie* case. It has been not uncommonly a subject for remark that this country abandoned a *laissez-faire* policy with respect to agriculture towards the end of the last century, and since then has spent a great deal of money, effort, and energy in stimulating agricultural research, agricultural education, and various activities intended to benefit farmers and increase the production of the land, and it might have been expected, after all that expenditure of money and energy, that some result should now have begun to show in increased output. But we must remember that agricultural education is like sowing seed and agricultural research is like planting a tree. We have to wait a long time, probably a generation, before we see results. And assuming that these efforts made by the State and the local authorities have, in fact, tended to increase output from the land, there have been very powerful factors on the other side, which have tended to outbalance and overshadow any influence that could have resulted from that State assistance.

I think it is true to say that less labour and, certainly, less capital have been put into the land during the last twenty or thirty years than formerly. This has had the inevitable result—and I am not casting any reflection upon the farmers—of a lower level of farming. One thing I might mention specifically, which I hesitate to mention in the presence of the President of the Commission, and that is drainage. During the past twenty years, if not longer, drainage has been by general consent neglected in this country. The effect of that upon the productivity of the land can hardly be exaggerated.

One of the most common economic theories brought forward in connection with production from land is that decreasing acreage of a particular crop automatically takes out piece by piece the inferior land and leaves the superior land. This seems to me questionable. Taking the wheat crop in England and Wales, the three and a half million acres of 1871-5 fell to less than two million acres in the quinquennium 1891-5. During that great drop the inferior land—the land producing smaller crops—was probably taken out of cultivation, but I very much doubt whether in recent years when the fall was from 1.9 to 1.7 and, at the present time, to 1.6 million acres, it follows that the land taken out of cultivation was necessarily the inferior land in a particular parish or district.

I am sorry Mr. Venn is not here. In comparing yields per acre for a number of years he seems to have got up against a dilemma. Are all the figures from 1852 up to the present time strictly comparable or not? I am not quite sure whether he has made up his mind on this point. Certainly, so far as I am concerned, I regard the figures of the wheat crop from 1852-84 as not at all comparable with the returns collected under an entirely different system. The Lawes and Gilbert estimates were based upon five plots differently manured—five plots on one small piece of land in one part of the country, subject always to the same conditions of soil and climate. It was suggested that they represented the varying conditions over the whole of England and Wales, but I never could understand why that should be regarded as a reasonable proposition. As there was nothing better the estimates were accepted, and for some purposes they were no doubt of value, but that they should be expected to represent the average yield throughout the country always seemed to me to be unreasonable. Any conclusions drawn from comparisons of figures collected under that system and the official system described in the paper must be accepted, it seems to me, with very great caution. Mr. Venn has suggested that there is an unconscious bias on the part of the crop reporters. I venture to say that after Mr. Vigor's analysis it is very difficult to say that Mr. Venn has produced any proof of the bias. If there is no proof of bias it still might be true that it exists if there were any plausible reason for believing in its existence. But is there? It is the business of the crop reporters to represent the facts as they see them and understand them, and they are to some extent supervised and checked. There are many cases in which a bias may exist, but in this case I can see no valid reason for alleging its existence.

I was going to say that I wished Mr. Venn had made some constructive suggestion; but I remember that he has made two. One is that the crop reporters in future should be instructed "not to return below-average figures unless based on undeniable evidence." Does it mean that they may return over-average figures which are not based on undeniable evidence? Why should they be instructed to give more attention to one kind of result of their enquiries than to another? The other suggestion is a not unfamiliar one, that "standard" plots should be established throughout the country

as a check or control. I think that is at least worth consideration, though the Treasury might have to be consulted. But I very much doubt whether you could select sufficiently representative and typical plots throughout the country to be really a useful check on these estimates. What would happen if the results disagreed? Which would be accepted? The officials of the Ministry would be placed in a somewhat difficult position.

It always seems to me that there are three possible systems of collecting estimates of crops. One is to obtain a return from every grower of the crop. That would involve a certain amount of expense as well as rather elaborate machinery, and I am not at all sure that even then you could rely upon getting precise accuracy. There a bias of the grower may come in, and there are two possible directions for bias. One is the idea of exaggerating his own achievements, but that, I am bound to say, is not a common fault with the British farmer. It is rather more likely that we should find that the returns tended to be below the truth. At any rate, I am not at all sure that you could rely on that system. In the case of grain crops you would have to wait, under that system, until all threshing was done. Most of the threshing is done by Christmas, but even in these times some is delayed until the following year.

Another system is that of sample, which I believe is adopted in some countries now. You choose a number of farms throughout the country as fairly and reasonably as possible, and take them as representative of the whole. There, again, I doubt whether the result is likely to be satisfactory, because it is practically impossible to avoid choosing those which are rather superior to their neighbours.

Those are two possible systems, and the third is that described by Mr. Vigor. I, being perhaps biassed, believe that it is the best that is practicable in this imperfect world. If Mr. Venn were here I should be inclined to invite him, if he had time and opportunity, to direct his attention to the crop reporting systems of other countries as well. I think if comparisons were made with other countries that shall be nameless, it might be found that on the whole the English system would compare favourably with any system to be found in any other country.

LORD BLEDISLOE: When I entered this room I had no intention of taking part in this evening's discussion, and even now, when you, sir, have intimated your desire that I should speak, I approach my task with considerable hesitation, although most warmly desiring to support the vote of thanks which has been proposed by my friend, Sir Henry Rew. My hesitation is founded largely on two facts. The first is that you have just listened to the most distinguished and ablest agricultural statistician in Europe, and I feel some doubt in my own mind as to whether I am justified in following him. In the second place, this paper is of an undoubtedly controversial character, and it represents a controversy between two very able men, with both of whom personally I have a great deal to do. Both are men for whose work I have the most profound

admiration. But a controversy at least is stimulating and tends sometimes to augment the wisdom of the world, and in this case it has the charm of being wholly good-natured, good-humoured and friendly.

My difficulty is accentuated a little by the fact that *The Times* crop reports form part of the controversy, and I am conscious that up till a very short time ago I was myself a crop correspondent of *The Times*, and had been so for many years. But what I must confess with regard to my experience in that capacity is—and I confess it with all due modesty—that one's estimates are so often falsified, in the case of cereals, by the threshing machine. This was certainly very notable last year. I do not think I shall be exaggerating when I suggest that throughout the whole of this country the best farmers' estimates of their crops were at least 20 per cent.—I think probably 25 per cent.—below what the threshing machines proved to be the fact.

In most heartily seconding this vote of thanks, I can at least say that Mr. Vigor has in my judgment made out a *prima facie* case for the justification of the English figures for which he is himself so largely responsible; but what few remarks I want to make are mainly in regard to the problem of the reduced yield of cereals during the last few years, particularly since the war, and especially that of wheat.

I was glad that Sir Henry Rew referred to the question of drainage, which has been occupying my mind as Chairman of the Royal Commission more than any other subject during the last eight or nine months. Taking the larger view, extending over a longer period than appears to be under review this evening, there can be no question whatever that the land of this country has become in effect more and more water-logged and less well drained during the last fifty or sixty years, with lessened production which, but for the enterprise of farmers and the assistance that science has given them, would have been far less than it is to-day.

I should like to refer to "Yeoman" wheat. I rather doubt whether Mr. Vigor's statement that it is universally admitted that it is well suited to exceptionally stiff land can be borne out. My own experience is that if you want to grow a large crop of "Yeoman" wheat you must put it on the deepest and most lousy soil you can find—a soil that is not too stiff. As regards the cropping capacity of "Yeoman" wheat, a yield of thirty-two bushels per acre, which we used to talk about before the war, is, of course, in the light of modern knowledge, a much lower yield than this country ought to be satisfied with at the present time. I hope that I shall not be regarded as boasting if I tell you I should be rather ashamed of myself if, on my comparatively good wheat land, I were to grow an average of less than forty-five bushels to the acre in an average good season. But when you come to consider the reasons for the falling off of the average wheat yield in the last few years, surely they must be admitted to be obvious. Much land became seriously infested with weeds during the war, owing to lack of normal supplies

of labour, and where pasture was ploughed up by people who were not conversant with the growing of arable crops, much of the land became badly infested with wireworm, and as a consequence the normal yield of all crops has been substantially reduced, especially in the case of wheat. The relatively high cost of labour has created a natural tendency on the part of farmers to economize in their labour, and has reduced the number and the efficiency of arable cultivations on the average farm. May I say, with regard to the average farm, that I do not know of any country (Mr. Christopher Turnor is present to correct me if I am wrong) where the high standard of farming stands out so much above the average standard as it does in this country, whether you are dealing with crop production or with animal husbandry; and therefore I think it is just possible that if *The Times* looks only to the more prominent, enlightened, and successful farmers to make returns in many districts, it may get returns which are above the actual average for the country at large.

I do hope that the year 1921 will not be too much quoted as a guide or as any criterion of what a reasonably good season may be expected to produce. 1921 was an amazing year. In wheat, potatoes, and other crops there were many cases of yields such as had never been known in the memory of man. On my own farm I was able to reach ninety-six bushels of "Yeoman" wheat, and that was by no means the largest yield in the country. That, of course, was under perfect conditions of growth on excellent, deep, loamy soil, and with perfect harvest weather.

When Scotland is quoted, I think we ought to remember that wheat is not pre-eminently a Scottish crop, and I think I am right in saying that there are fewer farmers there who turned pasture into arable land during the war than there were in England.

In Scotland, therefore, the cultivable area was relatively smaller, and the possibility of producing cereal crops upon ploughed-up grass was of course relatively less.

Finally, when we admit, as I think we have to admit, that the standard of farming has been lower since the war than it was before, I am bound to say that personally I think it has been surprisingly high, considering the disheartening factors in relation to farming that have operated to check the farmer's enterprise during the last few years. There are two that have operated mainly, namely, (1) monetary causes, over which the farmer has no control, and (2) the steady decline of prices of produce during the last few years (with one short interval in 1924), with no corresponding decline in the costs of the farmer's raw materials or his labour.

But I think we may look forward with confidence in this respect to the future, and I place my confidence upon the greater employment and the greater cheapness of fertilizers, coupled with a greater understanding of their use, especially in the case of nitrogenous fertilizers, thanks to the synthetic production of nitrogen from the air, and I think this greater and more informed use of fertilizers is calculated not only to increase enormously the yield of grass lands

in this country which have been relatively unfarmed and unfertilized for years, but also to increase the arable crops, including the wheat crop, on areas specially suited to their production.

I beg to second the vote of thanks to Mr. Vigor for his valuable and interesting paper.

The Hon. Secretary then read the following communication from MR. J. A. VENN, who was attending a conference in Rome, and was therefore unable to make his comments in person, as had been hoped:—

My memorandum dealt with three different aspects of crop estimating, viz. historical, statistical, and human. Mr. Vigor has devoted a very great amount of space in seeking to disprove my contentions under the first of these heads, and here I confess that his aspersions upon the work of Lawes and Gilbert (fundamental as they must necessarily be from his standpoint) leave me unmoved. Perforce the economic analysis of their records involves the personal equation, and I am content to have my interpretation placed before the Fellows side by side with that of Mr. Vigor, who does not accuse the Rothamsted figures of bias but, in general terms, of untrustworthiness—a highly important distinction. Incidentally I find no comment upon the disparity, to which I drew attention, between the original “estimated ordinary average” and the demonstrated results of ten years’ crop reporting.

In regard to Mr. Vigor’s defence of official methods of collection, I can only suggest that (it being, for obvious reasons, impossible for me to give fuller particulars) if in his private capacity he will visit Eastern Counties crop reporters and talk over their procedure and methods, he will find that “repeated personal investigations . . . supplemented by actual results . . . obtained by the exact weighing and measuring of crops” are not as regular a feature of their activities as he imagines. Areas of 80,000 acres, containing upwards of fifty parishes, can be inspected neither easily nor frequently, and what has been described as “a good man” in each parish represents the main source of information for reporters, who are in effect intermediaries between those (farmers) who have officially been held not competent to assess outturn, and headquarters.

I am again prepared to leave our rival interpretations of the Scotch, Irish, and Welsh yields to the adjudication of Fellows. I must, however, draw attention to the fact that Mr. Vigor virtually ignores my figures relating to the markedly greater deviation of cereal yields in other, and comparable, countries, and I would ask him to investigate fully this phenomenon, which is by no means confined to war and post-war years, or to specially selected countries. I am also at a loss to understand his explanation of the steady decline in the mean deviation of British cereals from, if I remember aright, some 7 per cent. to 4 per cent. during the life of the official series of statistics. Correspondence with continental and other authorities leads me to the conclusion that the disparity is not easily explained away.

Examples of anomalous yields occupied about two pages in my article, and Mr. Vigor criticizes adversely only two of this large number, in one case relying on a statement made by Sir Rider Haggard, that farm equipment had deteriorated in a certain area; it is legitimate to assume that he has tested my other instances, and finds no fault in them. Hundreds of others could be adduced.

In regard to the probable effects of new varieties of cereals upon the rates of yield, I hope that plant breeders may participate in the discussion, and that Mr. Vigor will make available figures relating to the distribution of wheat varieties in East Anglia secured three or four years ago.

Mr. Vigor firmly refuses any measure of recognition to *The Times* series of figures, but most of his criticisms of that journal's methods are equally applicable to the official system. The local correspondents are of a similar type, viz. practical farmers, and their distribution and procedure during past decades has been described. Fellows will, therefore, be in a position to judge for themselves whether *The Times* records are likely to be as unreliable and biased as Mr. Vigor holds. If considered acceptable as evidence, their overall divergence from the official series is more marked than appears at first glance, for the necessary process of weighting accentuates this disparity.

I have the support of certain widely recognized authorities in drawing attention to the disabilities of a system that supposes errors to balance one another and ignores the recognized psychological bias towards under-estimating differences. All the numerous independent tests applied seem to me to bear out this conclusion; comparison with the only available alternative records, past and present, points the same way.

I thank Mr. Vigor for the friendly spirit in which he has criticized my contentions and take this opportunity of assuring him that by no means do I regard my deductions as infallible; doubtless the truth, if ascertainable, would be found to lie somewhere between our divergent standpoints.

MR. CHRISTOPHER TURNOR asked, as a visitor, to be allowed to say a few words. He had been very much interested in the subject of yield of crops, and he would like to emphasize one point. He could not understand why anyone should be surprised that the official figures did not show an increase of yield during the past five or six decades. How could such an increase be expected, since the working capital per acre was much lower than it used to be? There was a downward tendency in the amount of farming capital per acre; also, the British farming industry was denied that access to credit that was so conspicuous a feature on the Continent. These two points must be thought of in this question of yield, and Mr. Turnor was quite certain it was not too much to say that the reason for the development of agriculture, and the increase of yield from the soil which, decade by decade, had been so noticeable in foreign countries, was due to their access to credit; in other words, their

working capital per acre was much more than it was in Great Britain.

When motoring through the country when the corn was ripe, as he did so often in this country and in other countries, he was not surprised at an average of about thirty-one or thirty-two bushels per acre here; in fact, he had often been filled with wonder as to how that figure was reached. When one went through the country and saw field after field where it was possible to see the ground through the crop, one could be certain that the crop was bad—not more than two or three quarters. Mr. Turnor admitted that he became more doubtful when he began to estimate crops of over five quarters in that way; he liked to see a crop through which it was not possible to see the ground. In a normal year the threshing machine generally confirmed the impression made by the appearance of the crop. But in a year like 1926, the results belied the estimate. He himself had been out by a good deal more than 20 per cent.

These were the points that Mr. Turnor wished to emphasize.

MR. R. B. FORRESTER said that the paper had been most interesting, but there were one or two small points he would like to make. The first was with regard to method. He did not feel confident that there was not a psychological bias among the farmers which might cause them to under-estimate their yield. The influence of taxation upon some classes might be taken as an illustration of this effect; farmers might feel that it was desirable to keep down the yield if they were going to attempt to influence public policy. He suggested that between the English, Scottish, and Irish figures a little more light might be obtained by taking representative areas.

As the Agricultural Tribunal had pointed out, it was very difficult to compare returns of crops from different sized areas in different countries. Mr. Forrester wondered how far Mr. Venn's points could be tested by comparing the eastern counties with the well-known cereal-growing area in Scotland—Fife and the Lothians. What was puzzling was that Mr. Venn should wave aside the economic explanations, and not push that side of his paper further. He felt inclined to agree with Mr. Vigor that any lowness of yield of British agriculture pointed out by writers was capable of explanation on economic grounds. First of all there was the broad question that yields per acre were not an economic test of progress; British agriculture might be making constant economic progress and yet have a stationary yield per acre. The trend of industry could not be estimated over a series of years by yield; other factors had to be taken into consideration. Mr. Forrester very much doubted whether on the economic explanation British agriculture would have been shown to have gone backwards. It might be a matter of doubt, but as compared with other countries in Europe, there seemed little doubt that the British position was relatively good, if the unit of output per person engaged was taken as a test, instead of yield per acre, and therefore one could hardly put quite the same pessimistic interpretation upon the matter as Mr. Venn did.

As regards the quality of land, it did seem doubtful, as Sir Henry Rew had pointed out, whether it was the worst land that went out of cultivation first. In actual fact, what usually happened was that if there was a profitable alternative use for any land, it went into that use, and often land of the very highest farming quality went out of cultivation in this way.

While appreciating the points made in Mr. Vigor's paper, he thought that its last sentences appeared to indicate the view that the Ministry's estimates as at present made, on present methods, were by no means incapable of improvement. Mr. Forrester would like some suggestion as to where the weakness lay, because on reading the paper he rather thought too little emphasis was placed upon that side of the matter.

The Hon. Secretary then read a communication received from Mr. J. M. CAIE, of the Scottish Board of Agriculture, as follows:—

I much regret that it will be impossible for me to be present at the meeting and to take part in the discussion, but as Mr. Vigor's paper, and that of Mr. Venn to which he is replying, contain some references to our Scottish Agricultural Statistics, I should like, if I may, to offer one or two brief comments on the comparisons made between England and Scotland.

While I have been unable in the time at my disposal to go into the matter in detail, I may say that in general I agree with Mr. Vigor's views. The system of obtaining crop reports in Scotland is the same as that in England. When the Board of Agriculture for Scotland was established in 1912 we took over the forty-two crop reporters who, in Scotland, had previously reported to the Board of Agriculture and Fisheries. That number is still practically unaltered (at present there are forty-three reporters), and while we have from time to time considered the methods by which our crop estimates are obtained, we have been unable to find any other machinery which, without great increase of cost and labour, would give us statistics presumably more reliable than those we now get. As the systems are identical in the two countries it seems to me that it would take considerably stronger proof than Mr. Venn has adduced to show that the results differ in their accuracy. Indeed, as the number of reporters in England (320) is now relatively larger than that in Scotland, there would appear to be, if anything, an expectation of greater accuracy in England. As a matter of fact, while probably in neither country can absolute precision be claimed for the produce statistics, I believe they show generally a reasonable accordance with the actual facts, and that the figures over a series of years, and particularly averages for a number of years, are quite fairly comparable.

Mr. Venn throws doubt on some of the English figures because they show less advance in production than do our Scottish returns, and he argues from this that the English figures are therefore less accurate. I find it difficult to see why the psychology of the English reporter should differ in this matter from that of his Scottish

colleague, who is drawn from exactly the same class of men, or why he should tend to understate the facts. So many factors, climatic, economic, etc., may affect the actual production in the two countries that it seems *prima facie* unnecessary to postulate a more pessimistic outlook on the part of the English reporter. Personally, I incline to the view that there has possibly been a greater upward trend of production in Scotland than in England. It has sometimes been claimed, perhaps with reason, that, speaking very generally, the Scottish farmer has been somewhat more adaptable, somewhat more receptive of new ideas, than the English farmer. Be that as it may, it is quite true, as I think Mr. Vigor suggests, that the Scottish farmer during the periods of agricultural depression has maintained his arable cultivation rather better than the English farmer and has not to the same extent taken refuge in laying down areas to permanent grass. He has rather tried to improve his methods, to lower his costs of production and, to some extent, to increase his area of rotation grass without, however, abandoning arable cultivation. (This fact contributed to make it less difficult and less costly in Scotland than in England to increase the areas under crop during the war years.) I recognize that the contraction of the arable area in England and the probable consequent elimination of the poorer land would rather tend towards maintaining higher production in England than in Scotland. But, as Mr. Vigor says, this is only taking one factor into account, and the case is not quite so simple as that.

During the last twenty to twenty-five years there has been a great growth of agricultural education in Scotland. New and heavier-cropping varieties of oats and potatoes have been introduced; methods of cultivation have been improved; much larger quantities of artificial manures have been applied to the land, and generally the increased production in Scotland is quite in accordance with what one would expect. Whether these processes have gone on to the same extent in England I am unable to say, but, as I have indicated above, the claim has certainly been made that the Scottish farmer, largely as a result of the conditions under which he works, has been obliged to be, in these matters at any rate, more progressive than the farmers in some parts of England.

I agree with Mr. Vigor in saying that in a general way our Scottish soils are less liable to suffer from extremes of drought or rainfall than the land in some of the important crop-growing districts of England. We have, for example, little of the very heavy clay soils which react so adversely to extremes of weather, and we have large areas, particularly in the crop-growing districts in the north-east and east of Scotland, of soils derived from a mixed glacial drift which do resist comparatively well either heavy rainfall or prolonged drought.

It is perhaps unnecessary for me to say more in confirmation of what Mr. Vigor has written so clearly and cogently. I would simply summarize my views by saying that, so far as I can judge, it has not been proved that the differences between the English

and Scottish figures are not based on facts, nor has sufficient evidence been brought forward on which the accuracy of the English records can fairly be challenged.

I should add that my views are purely personal, and are not necessarily to be taken as those held officially by the Board of Agriculture for Scotland.

MR. UDNY YULE said that as time was getting on the discussion must be brought to a close, but he would like to make a few remarks himself.

Behind this personal controversy as between Mr. Venn and Mr. Vigor, he thought all had got in their minds the simple question of how far the Ministry of Agriculture's estimates could be trusted. That was necessarily—as he felt sure Mr. Vigor would agree—an extraordinarily difficult question to answer simply because the truth was not known. Each one was apt, therefore, to tend towards one or another view on difficult points according to the prepossession in his mind. He was afraid that he himself would approach the question with a prepossession against trusting any form of eye estimate. It might be said, for example, with perfect truth that it would be a very expensive matter indeed to carry out a thorough anthropological survey of the stature of adult males in England and Wales, and that therefore the clergyman of every parish should be asked to return an eye estimate of adult males in his parish. The standard error of the mean would be the standard error of the individual estimate divided by the square root of 13,000, and that could not fail to be a very small quantity. Doubtless one might argue like that for a long time; but he personally would *not* trust any average taken for England in that way, and much less would he trust county averages. He would be afraid of bias coming in, in various ways. Similarly, he was not inclined to trust eye estimates so far as they contributed to estimates of agricultural produce. Friends with whom he had talked stated frankly that if they wanted to estimate the produce of a given field, they had to make a very careful examination of that field from more than one point of view. A crop reporter had an area of more than 80,000 acres—something like 125 square miles—and it would obviously be impossible for him to make anything like a thorough examination of such an area. There were two ways of obtaining an estimate for an area: (a) to make a personal estimate, which on an area so extensive could not be considered as possessing any reliability, and (b) to obtain returns from farmers. But, as Sir Henry Rew had said, the British farmer often had a bias in favour of making his returns too low. So that one was on the horns of a dilemma. Either the reporter must carry out his estimation himself, which was impossible owing to the size of the area, or he must get his returns from farmers, who were liable to bias. Mr. Vigor said that estimates were supplemented by reliable information as to amounts threshed “to a very large extent.” Could Mr. Vigor say even for one crop, such as wheat, for about what percentage of the crop actual weighed

quantities were obtainable? Mr. Yule said he had asked a friend what percentage of the crop is weighed immediately after threshing, and he replied that he would put it at not more than 30 per cent. For the rest there could only be a rough estimate by the number of bags, which was not of much value. How far did Mr. Vigor get actual weights?

There seemed to be two main risks of bias:—(1) Under-estimation. Mr. Venn had shown (*Economic Journal*, September 1927) that the crop reporters in their forecasts tended to be markedly pessimistic. The September forecast was only above the final figure six times in twenty for wheat, seven times for barley and twice for oats. Such pessimism seemed bound to affect the final figure itself, so far as the crop reporters contributed to it. So far as the farmers themselves contributed, Sir Henry Rew had admitted they were biased in the same direction. (2) Inadequate estimation of divergences from the average. On this head Mr. Yule admitted the evidence was very indirect, but he believed there was some evidence of a tendency to under-estimate divergences in other fields.

He did not think that Mr. Vigor had quite proved his case as against Mr. Venn's arguments.

He need not explain that these remarks were not criticisms of the paper, but simply illustrations of the points that came to mind when one did not trust the estimates of the Ministry of Agriculture. He felt that they desperately needed some sort of check, or some method of arriving at an indication as to the magnitude of the error that might exist in those estimates.

He would like heartily to support the vote of thanks to Mr. Vigor that had already been proposed and seconded.

MR. VIGOR, in reply, desired to thank the meeting for the cordial Vote of Thanks which they had carried. He was indebted to the Council of the Society for the opportunity to bring forward for public discussion this important question on which differences of opinion existed; the discussion could only be helpful to the cause of good crop estimates.

He was glad that Mr. Venn, whose inability to be present he regretted, had been able to send a communication. The reason that he had not appended to the paper the full examination which he had made of the "anomalies" found by Mr. Venn in different counties was that he did not think he could reasonably ask the Society to print as an appendix a document that ran into twelve pages of typed foolscap. He had merely appended an examination of the first two cases for which Mr. Venn had cited figures. Mr. Venn's assumption that he accepted his views of the other cases was not legitimate.

The question of difference between average crop yields for the first decade (1885-94) and the "estimated ordinary average" supplied by the crop reporters in 1885 had again been mentioned. The "estimated ordinary average" of 1885 related to normal seasons, but if reference were made to Hooker's investigations of 1922 (already

quoted) the conclusion would be drawn that the weather of the decade 1885-91 was not particularly favourable, but included, in 1893, the worst season since 1879. He did not think that the reductions of yield shown were larger than could fairly be attributed to climatic variations.

It was satisfactory that Mr. Venn admitted that crop reporters probably had "one good man as a correspondent" in each parish; this would make about 13,000 for the whole country, so that he and Mr. Venn were now approximately in agreement on this point.

Mr. Venn's statement that *The Times* yields, if properly weighted, showed an even greater divergence from the official estimates than they did if unweighted seemed to lend further support to his (Mr. Vigor's) view that that series of estimates probably represented a rather better type of farming than the average of the country. He noted that Lord Bledisloe, as a former *Times* crop correspondent, was inclined to agree with this view.

Mr. Yule had approached the discussion from a standpoint different from that of other speakers, and of Mr. Venn and himself. He had a prepossession against trusting any form of eye-estimate, and for this reason distrusted any crop yields in compiling which eye-estimates played a part; he would not trust any average taken for England in that way, and much less would he trust county averages.

If one accepted Mr. Yule's views, which clearly applied to the yields of the whole of the forty-year period reviewed in the paper, it seemed to be a waste of time for either Mr. Venn or himself to attempt to analyse the official yields of England, and to compare them with those of *The Times* series, or with those of Scotland, Ireland, or indeed most other countries, in nearly all of which the element of eye-estimate was present in greater or less degree. It was necessary, however, to scrutinize closely the assumptions behind the arguments of even so distinguished a statistician as Mr. Yule. Mr. Yule compared the parish crop estimates with the estimates which would be made by a parish clergyman who might be asked to estimate the average height of adult males in his parish. Mr. Yule's analogy was not, however, very happily chosen, and was unfair to the crop reporters. Parish clergy were not chosen for their posts on their skill in estimating the height of adult males in their parishes; on the other hand, it was the common professional task of tenant-right valuers to estimate growing crops, and crop reporters were chosen from the ranks of tenant-right valuers and similar men on their qualifications and experience in regard to crop estimating. Moreover, the personal estimates of crop reporters were supplemented by actual records of threshing. He thought that if Mr. Yule substituted a skilled height judge for his parish clergyman and arranged for a proportion (say 5 per cent.) of the adult males to be actually measured and their heights to be supplied to the judge when he was striking his average, he would get a more appropriate analogy to the system for obtaining parish crop estimates.

Mr. Yule's second assumption was that in so far as the estimates were dependent on farmer correspondents, they were liable to be

under-stated. There seemed to be some doubt whether farmers did, in fact, generally under-estimate their crops. Evidence did exist in an official report of 1885 that crop reporters had found that crops frequently threshed out better than farmers had previously estimated. He (Mr. Vigor) had, however, also been informed that the general experience of corn merchants was that farmers, when negotiating the sale of corn, usually believed themselves to hold more corn in stack than the threshing results finally decided. Whether this was so or not, the essential part of the official system was that final estimates were based as far as possible on actual threshing results, and not merely on eye-estimates of either crop reporters or of farmers.

Mr. Yule had asked him to say for about what percentage of the wheat crop actual weighed quantities were obtainable by crop reporters. He had no definite information, but probably each correspondent would be able to furnish to his crop reporter actual results of threshings from corn-fields on his own and some of his neighbours' farms, and also an estimate for his parish, with similar information for potatoes and hay. Returns under the Corn Returns Act showed that between 10 and 15 per cent. of sales of wheat took place between 1st September and mid-October; the proportion was higher for barley and lower for oats. He thought that the corn delivered for these sales provided ample material from which to secure weighed records of actual yields.

In response to Mr. Forrester's suggestion that a little more might be said about the weaknesses of the system of crop estimates, he offered the following observations. The errors of estimating seemed to be of three main kinds. First, the ordinary error of precision which would always occur, even for a reporter of the greatest skill where no personal bias or special deceptiveness in the crop occurred. It was not possible to say whether an estimate of, say, 38 bushels would be within a bushel of the figure which would be found if the whole crop could be weighed. Such errors should undoubtedly tend to cancel each other over a large area. Second was the error due to unusual deceptiveness in the appearance of a crop. This might be local, and not of great importance, and probably balanced by similar errors elsewhere; or it might be general, and therefore leading in some years to over-estimation or under-estimation of the total crop. This error should tend to be checked by the fact that yields for corn and pulse crops were not made up until 15th October, and in future will not be made up until 15th November, and also by the opportunity for revising the yields some months later. Yields of roots and potatoes had never been made up until 15th November. Third was the error of bias, due (1) to a reporter having an unduly high or low opinion of the yields of certain parishes, an opinion that should tend ultimately to be corrected by threshing results; (2) or to insufficient allowance being made for variations from year to year.

Mr. Yule and Mr. Venn had both expressed the view that yearly variations would tend to be minimized or smoothed out. No evidence was offered to support this view, and he thought that such

criticism drew its source largely from failure to appreciate that final estimates were influenced largely by actual threshing results, and from the fact that the critics probably saw practically no official yields other than those for counties and the whole country, which generally moved in comparatively small gradations from year to year. The reporters were not, however, responsible for county and national averages; they were concerned only with the parish estimates. As a very rough test of the variation of these estimates he had taken out the wheat yields of six parishes in Cambridgeshire, selected at random, each beginning with the letter B, with the proviso that each reporter's district was, if possible, represented. The area of wheat in the parishes varied from 300 to 1,000 acres. For the forty years 1885-1924 the extreme range of yields of these parishes was 16, 20, 23, 28, and 40 bushels respectively, the average being $24\frac{1}{2}$ bushels; almost exactly the same average range was shown in six parishes beginning with letter W, and he believed that any other six random and representative parishes in Cambridgeshire would probably show not very dissimilar results. Were these ranges wide enough? It was difficult to say, but as some criterion he had looked at the yields of seven small plots grown continuously with wheat at Rothamsted * for the forty years 1885-1924. One would expect a very wide range on these small experimental plots, the yield on some of which was in certain years practically a failure. Their average range was 29 bushels per acre. He also found that for six plots at Rothamsted † where wheat was grown as part of a four-course rotation, the average range was 32 bushels for the period 1887-1923, which also included years in which the crop on some plots practically failed. He thought that the ranges of the average yields on substantial areas in the Cambridge parishes referred to compared satisfactorily with those Rothamsted ranges. This was only a rough test, but he was much impressed by the comparison, and thought that it should dispel any misgivings based on purely hypothetical considerations.

He was glad to note that, excepting Mr. Yule, all speakers, several of whom had a long and distinguished agricultural experience, endorsed his view that there was no reason to expect English crop yields to show an improvement in the previous forty or fifty years.

In conclusion he wished to express his indebtedness to Mr. R. J. Thompson, C.B., for much very helpful advice in the preparation of this paper, and to Mr. R. Ross, who was a mine of information on this subject, on which he had worked for a great many years.

* Broadbalk field.

† Agdell field.

As a result of the ballot taken during the meeting, the candidates named below were elected Fellows of the Society:—

Henry B. B. Beldham, A.S.A.A.
Rowland Rayner Breekin.
Yetsun Carson Chu.
Charles Nightingale Clay, B.Sc.,
A.I.C.
Aloysius Martin S. Fernandes, B.A ,
B.Sc.
Horace Sydney Freeman.
Manmohan Purechottam Gandhi,
M.A.

Gilbert Jackson.
Percival Arthur Lund.
Herbert Marshall, B.A.
Reginald George Maudling, F.I.A.
Thomas Egginton Paull.
Edgar Leslie Pritchard.
George Ridley.
Herbert Rodgers, A.S.A.A.
Hubert Basil Southam.
Ronald Staples.

Representative of Corporate Body.

F. B. Bourdillon, *representing* The Royal Institute of International Affairs.

(ON CERTAIN ASPECTS OF THE DISTRIBUTION OF INCOME IN THE
UNITED KINGDOM IN THE YEARS 1913 AND 1924.

By L. R. CONNOR, M.Sc.

[Read before the Royal Statistical Society, December 20, 1927,
SIR BERNARD MALLET, K.C.B., in the Chair.]

Introduction.

IN the course of the past decade or so there has been a significant change in the form of the income distribution curve for the United Kingdom—a change exhibited by the fact that increases in the monetary incomes of the rich have not kept pace with the rise in prices and the increases in monetary earnings secured by the working classes—and the present paper aims at an appraisal of the position through the medium of an enquiry into the incomes of specimen tax-payers* in the years 1913 and 1924 or thereabouts.

The distribution of income is a difficult and intricate subject, for not only are the official statistics technically inadequate but it is by no means certain how much income escapes assessment. Evasion, in the ordinary sense of the word, is a minor issue, for the total amount concerned is not large, and there is no evidence that the practice is confined to any particular classes of tax-payers. A more elusive problem is involved by the growing practice of disguising income under the form of "capital appreciation," the effect of this device being to transfer an uncertain amount of annual purchasing power out of the category of personal into the category of non-personal income. Not only is the deficit unequally distributed along the scale of personal incomes, but its total amount is on the increase. We have no means of estimating the present extent of legalised avoidance, but considering the specialised knowledge required to lay out money so as to secure capital appreciation, the inconvenience and risk involved, and the extent to which large estates are tied up under wills and settlements, the field of opportunity must be limited, and it is not thought that the disturbance is serious enough to invalidate any broad conclusions that may be drawn from this enquiry.

* In what follows the term "income tax payer" will be used elliptically to denote a person above the statutory exemption limit, whether liable for payment of tax or not.

No doubt many of the profits of avoidance will in due course be swept up by the death duties, and this fact suggests that the present enquiry should be supplemented by an enquiry into capital wealth, as reflected in the estate duty statistics. The situation will, however, require time to work itself out, and meanwhile we have no option but to accept the official statistics as they stand, with the reservation that the computed indices of change in specimen incomes will to this extent not reflect the true position.

Preliminary survey of the problem.

A clearer insight into the essentials of the problem will be obtained if we anticipate some of the detailed results that will follow at a later stage and plot the incomes of income tax payers for the years 1913 and 1924 upon a cumulative double logarithmic scale.* This has been done in Diagram A, in which estimated income is plotted along the x axis, and the estimated number of persons in receipt of incomes of £ x or more is plotted along the y axis.† (See firm lines A A' and C C': the broken line B B' does not concern us for the moment.)

If we regard y as the independent variable instead of x it is an easy deduction that in virtue of their continuity the curves exhibit the income of the n th person, supposing the population ranked in order of income counting from the top, and it is this special property of the curves of which we shall avail ourselves. On this basis the vertical intercepts between the two curves represent the relative increases in the numbers enjoying a given income or more, while the horizontal intercepts represent the increases in monetary income received by persons of corresponding rank on the scale.

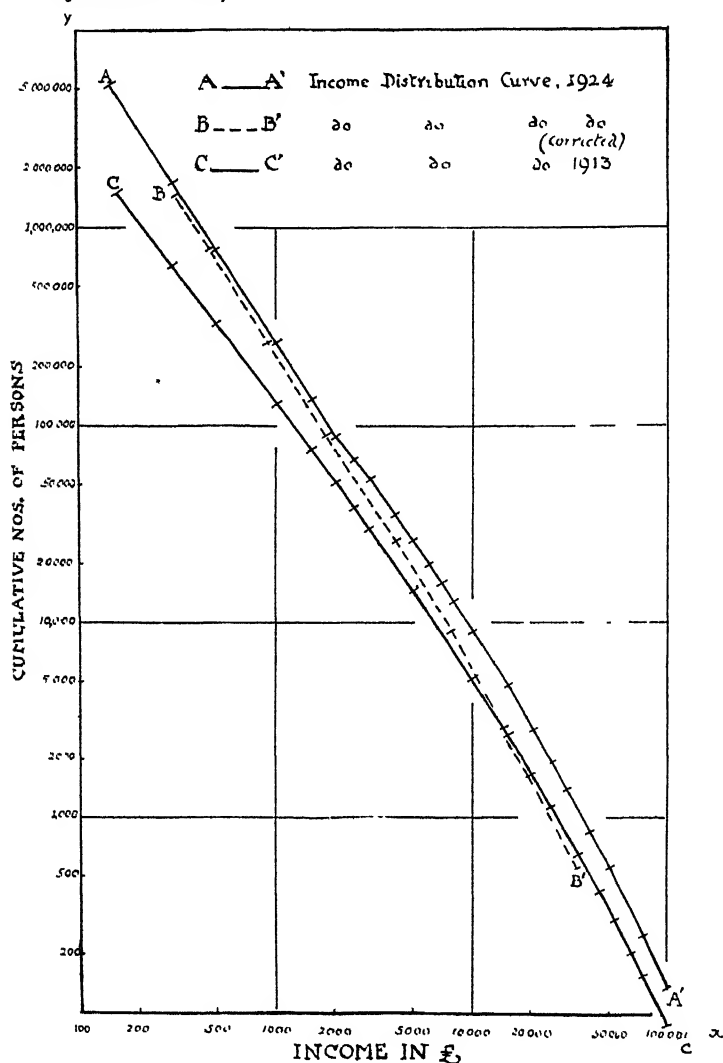
The diagram covers about 7 per cent. of the population in receipt of incomes in 1913, and about 25 per cent. of the population in receipt of incomes in 1924.

The two curves in Diagram A converge relatively rapidly at first, then run nearly parallel, and finally converge again, more slowly than at first. The obvious interpretation of this convergence is that the gains in monetary income made by the less well-to-do have on

* The adoption of the cumulative double logarithmic scale is essential because the figures are presented in groups of varying widths and show large variations in magnitude

† Strictly speaking, we ought to scale one set of the y 's up or down so as to equate the total populations in receipt of income in the two years. These totals are not known exactly, but I have estimated them at 20·8 mn. in 1913 and 20·6 mn. in 1924 (allowing for the exclusion of Southern Ireland at the latter date), and I do not consider the difference between the two significant with respect to the probable errors of the estimates. No adjustment on account of population changes has therefore been considered necessary.

DIAGRAM A.—*United Kingdom. Estimated distribution of incomes above exemption limits, 1913 and 1924 (cumulative double logarithmic scale).*



balance been greater than the gains made by the more well-to-do; and on the evidence of the diagram there has been a substantial redistribution of income in favour of the former class.

It is now proposed to establish results in detail, indicating as we

go along the assumptions upon which they rest and the adjustments necessary to correct inconsistencies.

Stability of conditions.

It is not always appreciated that a reliable estimate of national income can only be made under favourable conditions.

"The valuation of national wealth is a delicate and difficult operation which implies many hypotheses which are only true when the economic and financial organism is in a state of equilibrium. When this is not the case, the operation lacks precise significance. Something similar occurs in certain physical operations, for instance, in weighing, which cannot be carried out with moving bodies" (Gini).

Statutory income is not entirely identical with income of the current year: in large part it is presumptive, and represents estimates based upon profits of past years, which in turn frequently involve valuations of an hypothetical and contingent nature. In normal years the balance of error involved in these estimates tends to be relatively small and nearly constant, but in times of economic disturbance, problems connected with the valuation of unsold stocks and work in progress, provision for wear and tear, the liquidation of transactions in foreign currencies, deviations of values from competitive levels owing to the existence of artificial restrictions, uncertainty as to the future rate of interest, etc., etc., involve a large margin of uncertainty.

Different categories of income are subject to different amounts of time lag, and this fact makes it difficult to get the income of a given year into focus.

In other words, the income distribution curve for the year t is based upon a collection of fragmentary estimates for the years $t - 3$ to t inclusive—estimates subject to large negative or positive errors according as business profits, as measured in monetary terms, have been on the increase or on the decrease. It follows:—(1) that the curves are always distorted to an extent dependent upon instability of general economic and financial conditions; and (2) that they cannot be exactly localised. The former drawback can be minimised by choosing suitable periods for purposes of study; and the latter by regarding the curves not as representing actual distributions in given years, but as illustrating tendencies over somewhat vaguely defined periods. It was therefore thought advisable to forego year to year comparisons and to select two years, one before, and the other after the war, as types for study.

All things considered, the years 1913 and 1924 are the most suitable,* for they fall within periods of approximate equilibrium, and it will be easy to relate them (if desired) to the years 1911 and

1924, which were selected by Professor Bowley and Sir Josiah Stamp in their recent study of the national income.

Comparability.

Diagram A is primarily based upon the super-tax statistics, and its extension so as to include estimates of the numbers of income tax payers in the various grades was in the nature of an after-thought, prompted by the wish to make the picture as complete as possible, even at the price of including some debatable matter. The super-tax returns possess in a high degree the attributes of stability and continuity, and I do not imagine that any question will arise on the score of their accuracy and reliability. The combination of income tax data with super-tax data in one diagram involves certain theoretical and practical difficulties, for the two taxes are assessed on different principles, and there is no guarantee that the figures yielded are comparable, whilst matters are complicated by a considerable change in the exemption limit considered with respect to the value of money, involving the inclusion of four million additional tax-payers. In particular, it has been impossible to reconcile the official figures of abatements on small incomes and of total numbers of tax-payers in 1913 with other data at disposal, and the only conclusion one can draw is that a system of assessment based on abatements and stoppages at the source may yield results substantially different from a system of assessment based on compulsory declarations of total income. I therefore decided, after some hesitation, to reject the official 1913 figures of numbers of tax-payers and abatements as heterogeneous, and to base my estimates upon the numbers of tax-payers required to produce the aggregate amount of income returned by the Inland Revenue Department. As regards 1924 the discrepancy did not occur, and this is presumably due to the fact that a much larger proportion of tax-payers make declarations of total income than used to be the case.

On the basis adopted it is assumed that 200,000 additional tax-payers would have come into view in 1913, had the 1913 assessments been conducted on the same principles as those of 1924.

Income tax statistics.

Income tax statistics are not compiled in a thoroughgoing scientific fashion; they are, so to speak, a by-product of the taxing process, which precipitates them in a fragmentary and capricious manner, with little apparent regard to the requirements of the statistician. There is a special vagueness about their tails, where

they merge into the unexplored area of the untaxed, and the total population—taxed and untaxed—is not accurately known.

Elaborate mathematical treatment is out of the question, but the method of percentiles is available if used with caution. In applying this method the strict requirements of theory would oblige us to break up the population into homogeneous groups, by occupation, social status or otherwise, and to compare corresponding percentiles within these groups. As a practical proposition this refinement is, of course, impossible, for there are hardly any data as to the income of separate groups above the wage-earning level.

We have, therefore, no alternative but to deal with the data in bulk, upon the assumption that they are sufficiently numerous and sufficiently homogeneous to override disturbances due to this cause. It appears from Diagram A that the successive indices of increase run fairly smoothly, and so far there is a presumption that the method employed is sound.

Statutory and true income.

Income tax statistics only refer to statutory income: the differences between statutory and true income are mainly due to:—

- (1) The employment of the three years' average for Schedule D assessments;
- (2) Over- and under-assessments, arising mainly from failure of taxing practice to keep pace with modern accountancy methods;
- (3) Avoidance on the part of tax-payers;
- (4) Transferences of income. Whereas interest, annuities and other annual charges upon income are adjusted in the assessments so that no item of income appears twice over, there are certain charges made through the instrumentality of taxation that are not allowed for. The chief items concerned are interest on non-productive national debt held internally, war pensions and old age pensions.

The errors appearing under heads (1), (2) and (3) will largely, though not entirely, tend to disappear in the comparison between the two years; whilst the errors appearing under (4) will require special treatment (*see below*).

Description of the official statistics.

We possess (1) classified statistics of numbers and incomes of super-tax payers, embracing a large fraction of total income but a small fraction of total population;

- (2) Estimates of the total number of income-tax payers (owing to the system of tax collection at the source, the actual numbers are not known);
- (3) Statistics of aggregate income assessed to tax (including an uncertain amount of non-personal income and income of non-residents);
- (4) For the fiscal years 1918-19 and 1919-20 only, complete distributions of income-tax payers and their incomes down to the £130 limit; and
- (5) Statistics of numbers of abatements on small incomes up to £700 (now discontinued).

It is unfortunate that the complete distributions noted under heading (4) refer to periods of economic disturbance. Many of the assessments were made on profits of war years during which ordinary competitive conditions were in abeyance, and the whole problem is complicated by the existence of the excess profits duty. These figures cannot, therefore, be accepted as evidence for the post-war period in general, although they perhaps may be useful for purposes of corroboration.

Estimates of distribution of income, 1913 and 1924.

I now come to the detailed estimates of the distribution of income for the years 1913 and 1924.

As already indicated, the super-tax statistics have been accepted as they stand. I call them "estimates" and not "actual figures," because there is always an element of doubt as to the actual period to which the figures of a particular fiscal year refer.

Considerable difficulty was experienced in bridging over the gap between the marginal super-tax payer and the marginal income tax payer, *i.e.* between the £3,000 and £160 points in 1913 and between the £2,000 and £147 points in 1924. Details of the methods followed are given in the two succeeding sections, and here it will be sufficient to state that intermediate incomes were interpolated by means of "Pareto" lines upon the basis (1) that the aggregate income as computed from the line must agree with the aggregate income assessed, after allowance had been made for non-personal income and income of non-residents; (2) that the total number of incomes as computed must agree as nearly as possible with the total number as estimated by the Inland Revenue Department; (3) that the increases in monetary income between 1913 and 1924 registered by the curves must be reasonable, and consistent with any other information available; and (4) that results as a whole must not be dissimilar from the results shown by the complete distributions for 1918-19 and 1919-20.

TABLE A.
Great Britain and Ireland.
*Estimated distribution of incomes above exemption limit, 1913.**

| Group. | | No. of persons. | Cumulative No. | Total incomes assessed. | Cumulative total. |
|-------------------|-----------------------|-----------------|------------------|-------------------------|-------------------|
| Exceeding. (1) | Not Exceeding. (2) | | | | |
| £ | £ | (3) | (4) | (5) | (6) |
| 100,000 | — | 90 | 90 | £mm. 15·8 | £mm. 15·8 |
| 75,000 | 100,000 | 69 | 159 | 6·0 | 21·8 |
| 65,000 | 75,000 | 47 | 206 | 3·3 | 25·1 |
| 55,000 | 65,000 | 75 | 281 | 4·5 | 29·6 |
| 45,000 | 55,000 | 146 | 427 | 7·2 | 36·8 |
| 35,000 | 45,000 | 229 | 656 | 9·1 | 45·9 |
| 25,000 | 35,000 | 495 | 1,151 | 14·6 | 60·5 |
| 20,000 | 25,000 | 537 | 1,688 | 11·9 | 72·4 |
| 15,000 | 20,000 | 1,034 | 2,722 | 17·8 | 90·2 |
| 10,000 | 15,000 | 2,561 | 5,283 | 30·8 | 121·0 |
| 5,000 | 10,000 | 9,404 | 14,687 | 64·0 | 185·0 |
| 3,000 | 5,000 | 15,524 | 30,211 | 59·8 | 244·8 |
| 2,500 | 3,000 | <i>8,349</i> | <i>38,560</i> | <i>23·3</i> | <i>268·1</i> |
| 2,000 | 2,500 | <i>13,280</i> | <i>51,840</i> | <i>20·7</i> | <i>297·8</i> |
| 1,500 | 2,000 | <i>24,090</i> | <i>75,930</i> | <i>41·5</i> | <i>339·3</i> |
| 1,000 | 1,500 | <i>54,070</i> | <i>130,000</i> | <i>65·6</i> | <i>404·9</i> |
| 500 | 1,000 | <i>196,300</i> | <i>326,000</i> | <i>134·3</i> | <i>539·2</i> |
| 300 | 500 | <i>316,500</i> | <i>642,700</i> | <i>120·5</i> | <i>659·7</i> |
| 160 | 300 | <i>837,300</i> | <i>1,480,000</i> | <i>178·7</i> | <i>838·4</i> |
| Other income. | | — | — | <i>112·6</i> | <i>951·0</i> |

The figures in italics denote estimates made by the present writer.

* In view of the discussion at the meeting I have modified the terms of my statement with respect to the italicised figures. (See pages 68-73, 76.)

Down to the £3,000 point the above figures follow the super-tax statistics for the fiscal year 1914-15.† To fill up the gap below this point we have statistics of the number of abatements allowed to persons with incomes under £700 classified in four groups, and an estimate of the total number of tax-payers in the fiscal year 1913-14 (viz. 1,190,000).

I have already expressed the view that the official figures of abatements on small incomes and total numbers of tax-payers in 1913 are not comparable with the super-tax figures. My reasons for suspecting them are as follows:—(1) If the crude data are plotted on a cumulative double logarithmic scale they yield a curve with an awkward bulge in the direction of the 1924 curve, for which it is difficult to account; (2) it is impossible to reconcile the suspected figures with the aggregate assessments made by the

† As super-tax assessments are based upon the income tax assessments of the previous year, it is necessary to compare the super-tax returns of the year $t + 1$ with the income tax returns of the year t , etc.

Inland Revenue Department, even though a most liberal allowance is made for non-personal income and income of non-residents; (3) a comparison of the distributions for the years 1913 and 1924 indicates that if we accept the official version of the number of tax-payers in 1913-14 the increase in the interval of eleven years in the monetary income of the 1,190,000th tax-payer is of the order of 125 per cent., a figure that appears inconsistent with other information at our disposal.

All these difficulties can be obviated by the assumption that in 1913-14 small incomes near the margin were under-assessed by post-war standards and that the true number of incomes above £160 in that year was not 1,190,000 but 1,480,000. On this basis the number of tax-payers and the amount of their incomes can be reconciled, and the increase in the income of the marginal tax-payer becomes 106 per cent., a figure that may be accepted as reasonable. Details of the discarded figures (together with a diagram) are given in the Appendix.

In the absence, then, of satisfactory evidence as to the shape of the curve between the £3000 and £160 points, I decided to adopt the simplest hypothesis consistent with the facts and to interpolate by means of a simple "Pareto" line.

In order to make matters quite clear I give some of the calculations:—

Pareto's formulæ for the distribution of income in their simplest form may be written—

$$y = Ax^{-\alpha} \quad \dots \dots \dots (1)$$

$$z = \int_x^{\infty} x \frac{dy}{dx} dx = \frac{\alpha A}{\alpha - 1} x^{-\alpha+1} \quad \dots \dots \dots (2)$$

where x represents income in £; y represents the number of persons with an income of £ x or more; z represents aggregate income above £ x ; α is a constant representing the slope of the curve (which generally has a numerical value of about 1.5); and A is a simple numerical constant.

Assuming provisionally the correctness of the assumption that the number of tax-payers above £160 is 1,480,000 and not 1,190,000, we have—

$$\log 30,211 = -\alpha \log 3,000 + \log A \quad \dots \dots \dots (3)$$

$$\log 1,480,000 = -\alpha \log 160 + \log A \quad \dots \dots \dots (4)$$

$$\text{whence } \log y = -1.327 \log x + 9.0951 \quad \dots \dots \dots (5)$$

In practice, z is not computed direct from formula (2), but advantage is taken of the fact that the average income above £ x =

$$\frac{x}{\alpha - 1} \quad \dots \dots \dots (6)$$

Applying these formulæ, we get the results shown in columns (4) and (6) of Table A (*italicized figures*), whence columns (3) and (5) are formed by subtraction. The residuum of £112·6 mn. yielded by this method agrees with the estimate of "other income" given by Professor Bowley and Sir Josiah Stamp.

Had the official estimate of 1,190,000 tax-payers been accepted, the amount of the residuum would have been £212 mn., a much higher figure than one feels disposed to accept. Taking all these facts in conjunction, it is clear, at any-rate to my mind, that the amended figure of 1,480,000 tax-payers is the better figure to insert for comparative purposes.

This adjustment is made without prejudice to the correctness of the Inland Revenue Department's estimates at the time when they were made, and merely implies that the additional 290,000 tax-payers would have materialized if the 1913-14 assessments had been conducted on the same principles as obtained in 1921.

TABLE B.

*Great Britain and Northern Ireland.**

Estimated distribution of incomes above exemption limit, 1924.

| Group. | | No. of persons. | Cumulative No. | Total incomes assessed. | Cumulative total. |
|-------------------|-----------------------|------------------|------------------|-------------------------|-------------------|
| Exceeding. (1) | Not exceeding. (2) | | | | |
| £ | £ | (3) | (4) | (5) | (6) |
| 100,000 | — | 138 | 138 | 28·0 | 28·0 |
| 75,000 | 100,000 | 114 | 252 | 9·8 | 37·8 |
| 50,000 | 75,000 | 307 | 559 | 18·4 | 56·2 |
| 40,000 | 50,000 | 301 | 860 | 13·4 | 69·6 |
| 30,000 | 40,000 | 557 | 1,417 | 19·1 | 88·7 |
| 25,000 | 30,000 | 543 | 1,960 | 14·8 | 103·5 |
| 20,000 | 25,000 | 977 | 2,937 | 21·7 | 125·2 |
| 15,000 | 20,000 | 1,860 | 4,797 | 32·0 | 157·2 |
| 10,000 | 15,000 | 4,403 | 9,200 | 53·1 | 210·3 |
| 8,000 | 10,000 | 3,789 | 12,989 | 33·9 | 244·2 |
| 7,000 | 8,000 | 2,932 | 15,921 | 22·0 | 266·2 |
| 6,000 | 7,000 | 4,123 | 20,044 | 26·6 | 292·8 |
| 5,000 | 6,000 | 6,096 | 26,140 | 33·3 | 326·1 |
| 4,000 | 5,000 | 9,797 | 35,937 | 43·7 | 369·8 |
| 3,000 | 4,000 | 17,487 | 53,424 | 60·1 | 429·9 |
| 2,500 | 3,000 | 14,650 | 68,074 | 40·1 | 470·0 |
| 2,000 | 2,500 | 21,341 | 89,415 | 47·9 | 517·9 |
| 1,500 | 2,000 | <i>50,285</i> | <i>139,700</i> | <i>86·0</i> | <i>603·9</i> |
| 1,000 | 1,500 | <i>123,000</i> | <i>262,700</i> | <i>118·5</i> | <i>752·4</i> |
| 500 | 1,000 | <i>510,400</i> | <i>773,100</i> | <i>345·8</i> | <i>1,098·2</i> |
| 300 | 500 | <i>938,900</i> | <i>1,712,000</i> | <i>355·0</i> | <i>1,453·2</i> |
| 147 | 300 | <i>3,488,000</i> | <i>5,200,000</i> | <i>701·0</i> | <i>2,154·2</i> |
| Other income. | | — | — | 245·8 | 2,400·0 |

The figures in italics denote estimates made by the present writer.

* See footnote to Table A (page 53).

Down to the £2,000 point the above figures follow the super-tax statistics for the fiscal year 1924–25. These are not expected to differ materially from the figures for 1925–26 (which are not yet published) and they may be taken as referring to the calendar year 1924.

In order to fill up the gap between the £2,000 and £147 * points, I drew up a number of hypothetical distributions, derived both from mathematical formulæ and from graphic considerations, but I failed to discover any simple curve continuous with the super-tax distribution that when integrated would yield the aggregate amount of income required. I found, however, that a simple "Pareto" line taken in conjunction with the official estimate of 5,200,000 taxpayers yielded just the right amount of income, and I finally decided to adopt it in spite of the fact that it yielded a discontinuity at its junction with the super-tax curve. Details of the calculations are as follows :—

$$\log 89,415 = -\alpha \log 2,000 + \log A \quad . \quad . \quad (7)$$

$$\log 5,200,000 = -\alpha \log 147 + \log A \quad . \quad . \quad (8)$$

$$\text{whence } \log y = -1.557 \log x + 10.0905 \quad . \quad . \quad (9)$$

This was found to give a total income consistent with the aggregate assessments returned by the Inland Revenue Department after making an allowance of about £245 mn. for non-personal income and income of non-residents. The latter figure agrees with Professor Bowley and Sir Josiah Stamp's estimate.

Comparison of "equivalent" incomes.

The curves marked A A' and C C' in Diagram A are found by plotting columns (4) and (6) of Tables A and B upon a double logarithmic scale. As already explained, the percentage increase in the income of the *n*th person between 1913 and 1924 is measured by the horizontal intercept between the two curves, and "equivalent" incomes at any desired point on the scale may be obtained by simple logarithmic interpolation.

Results for specimen incomes are given in Table C.

Column (2) of this table shows the rank of eight selected individuals measured from the top of the scale. Columns (3) and (4) show the incomes of the said individuals in 1913 and 1924, as estimated from Tables A and B, whilst column (5) shows the index of change in monetary income between the two years. It will be observed that the indices increase fairly regularly from 130 to 206 per cent., with a possible anomaly at the point where the super-

* The present exemption limit is £150 for earned incomes and £135 for investment incomes. On average it may be taken as £147.

TABLE C.

*United Kingdom.**Comparison of Equivalent Incomes 1913 and 1924.*

(A) without, and (B) with, allowance for transferences of income

| Case No.* | Rank of income. | Amount of income received | | Index of change (A) (Col. (4) — Col. (3) < 100). | Amount of "distinguishable" taxation in year 1924. | Amount of this taxation applied to debt interest and pensions. $\frac{371}{616} \times \text{Col. (6)}$. | Col. (7) as percentage on Col. (4). | Net income received 1924 (Col. (4) minus Col. (7)). | Index of change (B) (Col. (9) ÷ Col. (8) × 100). |
|-----------|-----------------|---------------------------|-----------|--|--|---|-------------------------------------|---|--|
| | | in 1913. | in 1924.† | | | | | | |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
| 1 | 559 | £ 38,400 | £ 50,000 | 130 | £ 27,193 | £ 15,600 | 31·2 | £ 34,400 | 90 |
| 2 | 2,937 | 14,300 | 20,000 | 140 | 9,373 | 5,390 | 27·0 | 14,610 | 102 |
| 3 | 9,200 | 6,870 | 10,000 | 145 | 4,002 | 2,300 | 23·0 | 7,700 | 112 |
| 4 | 26,140 | 3,320 | 5,000 | 150 | 1,526 | 880 | 17·6 | 4,120 | 124 |
| 5 | 89,415 | 1,330 | 2,000 | 150 | 393 | 226 | 11·3 | 1,774 | 134 |
| 6 | 262,700 | 587 | 1,000 | 170 | 154 | 88 | 8·8 | 912 | 155 |
| 7 | 773,100 | 261 | 500 | 192 | 45 | 26 | 5·2 | 474 | 182 |
| 8 | 1,480,000 | 160 | 330 | 206 | 25 | 14 | 4·2 | 316 | 198 |

* Cases Nos. 1-4 depend entirely upon official statistics. Cases Nos. 5-8 depend partly upon estimates made by the present writer.

† These cases were selected to correspond as far as possible with the cases cited by the Committee on National Debt and Taxation.

tax figures join the income tax figures. Columns (6) to (10) will be explained in the next section.

Correction for transferences of income.

Column (5) of Table C shows the percentage changes in specimen incomes that have occurred between 1913 and 1924 when allowance has been made for all charges upon income save such as are imposed through the instrumentality of taxation. These figures, however, require correction in view of the situation involved by the payment of certain elements of income, viz. interest on internal debt and pensions, out of other incomes, the peculiarities of these payments being; (1) that no equivalent services were rendered during the year in question; and (2) that they are definitely inflationary. This situation did not arise as a serious problem before the war, and it is proposed to ignore it as regards the year 1913. In the year 1924, however, there was a considerable amount of inflation due to this cause.

The total sum involved in 1924 was about £278 mn. for

internal debt interest and £93 mn. for pensions; total £371 mn., and the problem now proposed is whether this expenditure of £371 mn. can be apportioned amongst individual incomes upon any reasonable basis. Clearly this problem does not admit of a determinate solution, but an approximate solution may be given as follows:—For the fiscal year 1923–24 * net receipts from taxation were about £702 mn., of which some £646 mn. may be regarded as “distinguishable” (*i.e.* as taxation that bears an ascertainable relation to the income upon which it ultimately falls). It is then assumed that the charges represented by debt interest and pensions form $\frac{371}{646}$ ths of the total “distinguishable” taxation levied upon the respective incomes.

The amount of taxation levied upon a given income is, of course, not a determinate quantity, for it involves among other things the number of the tax-payer’s dependents and his habits of consumption. For the purposes of this enquiry, however, illustrative figures will be quite sufficient, and the tables given by the Committee on National Debt and Taxation, in which taxation has been related to specimen incomes, have been used as a basis, it being assumed that three-quarters of the tax-payer’s income is earned and one quarter unearned—these being the approximate proportions in the population as a whole.

Column (6) of Table C shows the amount of “distinguishable” taxation levied upon the respective incomes as ascertained from this report; Column (7) shows the amount of this taxation allocable to debt interest and pensions upon the basis assumed, *i.e.* $\frac{371}{646}$ ths of Column (6); Column (9) shows net income, *i.e.* gross income less taxation devoted to the objects indicated; and Column (10) shows the corresponding index of change. Column (9) has been plotted on Diagram A (see broken line BB’).

It remains to consider the logic of the reasoning that has made us stop short at taxation devoted to debt interest and pensions. It may be argued that taxation for these objects does not stand in a class by itself, but that rates and taxes for other objects may also involve the transfer of wealth from one person to another without equivalent services being rendered during the year in question; *e.g.* for education, poor law relief, etc. The answer to

* Figures for the fiscal year 1923–24 have been taken in preference to figures for the fiscal year 1924–25 in order to preserve comparison with the figures given by the Committee on National Debt and Taxation. This procedure is defensible upon the ground that much of the taxation of a given fiscal year may be regarded as a charge upon the income of the year following. In any event, the point is not of very much importance, for the calculations are approximate, and the income of a given fiscal year has no precise point of reference.

this contention is that the present paper aims at a comparison of incomes as ordinarily understood, and that we are bound by customary ways of thinking. While it is true that education and poor law relief are benefits that are paid for out of the incomes of other persons, they certainly are not, whilst debt interest and pensions certainly are, items of income in the ordinary sense of the word.

Summary of the discussion.

To summarise the discussion to this point, a series of indices has now been computed that will enable us approximately to compare "equivalent" incomes for the years 1913 and 1924, if by "equivalence of income" we understand that its recipients occupy corresponding ranks in the economic organization of the community. As mentioned before, this method is a mere variant of the method of percentiles.

The gross figures in Columns (4) and (5) of Table C which refer to incomes free of all charges save taxation are therefore relevant to enquiries concerning taxable capacity, whilst the net figures in Columns (9) and (10) show the position after allowance has been made for transference of incomes, so far as this is ascertainable.

Errors of the estimates.

Next, we shall consider the errors to which Column (10) of Table C is liable. The principal errors concerned are those involved in the estimates of numbers of tax-payers below the super-tax limits and in the corrections used for transferences.

Consideration of the possible alternatives to the estimates of the total numbers of tax-payers given by the writer suggests probable errors of 10 per cent. for 1913 and of 5 per cent. for 1924, and these margins may be deemed to include provision for errors due to interpolation by means of a "Pareto" line.

As numbers of tax-payers and income are very approximately connected by the formulæ:—

$$\log y = -1.5 \log x + C, \quad . \quad . \quad . \quad . \quad . \quad (10)$$

$$\text{and } \delta y/y = -1.5 \delta x/x, \quad . \quad . \quad . \quad . \quad . \quad (11)$$

we may infer that the percentage error in income is about two-thirds the corresponding percentage error in numbers and assess the relative error of the index of change (A) at $\sqrt{6.7^2 + 3.3^2} = 7.5$ per cent.

The error in the correction for transferences of income must be much less, as the margin of uncertainty chiefly affects the smaller

incomes, of which taxation takes a relatively small share. Assume 2.5 per cent., and on this basis the relative error of the index of change (B) will be $\sqrt{7.5^2 + 2.5^2} = 7.9$ per cent.

I take a wider margin of error for the income-tax area than for the super-tax area, and finally assume a probable error of 4 per cent. for cases Nos. (1)–(4), which fall within the latter area, and of 8 per cent. for cases Nos. (5)–(8) which fall within the former.

Conclusion.

Accepting the basis of calculation indicated in this paper, we should be justified in saying that between 1913 and 1924 there has been a significant change in the distribution of income, manifested by the failure of the higher incomes to keep pace with the rise of prices (estimated at, say, 70 (± 5) per cent.) and the increase in the earnings of the working classes. On the evidence of Column (10) of Table C, case No. 1 (£38,400) has suffered a decrease and case No. 2 (£14,300) has received an insignificant increase of monetary income; cases Nos. 3 (£6,870), 4 (£3,320) and 5 (£1,330) have received significant increases in monetary income, which have not, however, kept pace with the rise in prices; cases Nos. 6 (£587) and 7 (£261) have received increases that do not depart significantly from the rise in prices; whilst case No. 8 (£160) has received an advance in real income which is probably significant.

The increase (106 per cent. gross or 98 per cent. net) received by case No. 8 (the marginal tax-payer in 1913) is greater than the estimated average increase in the earnings of the wage-earning population (say 95 per cent. gross or 92 per cent. net), although it is not greater than the percentage increases received in certain occupations. On the principle of continuity, however, one would have expected it to have been markedly less.

This fact constitutes one of the two principal defences of my suggested increase in the estimated number of tax-payers in 1913, for it is easier to explain away a discrepancy between 95 per cent. and 106 per cent. than a discrepancy between 95 per cent. and 125 per cent.

The difference as it stands appears to be due to the following causes:—

(1) The two figures stand on different bases, one being worked up from the population as a whole and the other from individual groups, and the former figure makes more allowance than the latter for drift towards better-paid occupations.

(2) The exclusion of Southern Ireland in 1924 has had a disturbing influence, although I can find no means of measuring it.

(3) Working-class hours of labour have been substantially

reduced, whereas it is likely that business and professional men have not had similar relief.

(4) In any event the probable errors of the percentages are considerable, and the difference of eleven points lies well within their margin.

The results of this enquiry, although not so definite as one might have wished, sufficiently demonstrate the proposition that the well-to-do classes have suffered a considerable diminution of real income during the past decade or so, and that the extent of this diminution can be approximately measured.

APPENDIX.

As to certain rejected figures.

This Appendix contains particulars of the figures of total number of tax-payers and of abatements on small incomes that have been rejected for the reasons given in the text. In the following table the rejected figures are given in *italics*, while the figures obtained from formula (5) are given for purposes of comparison :—

TABLE D.
Great Britain and Ireland.
Estimates of Smaller Incomes, 1913.

| Income. | | Official figure-, 1913. | | Amended estimates, 1913. | |
|-------------------|--------------------------|-------------------------|-----------------------|--------------------------|-----------------------|
| Exceeding. (1) | Not exceeding. (2) | No. of persons. (3) | Cumulative No. (4) | No. of persons. (5) | Cumulative No. (6) |
| £ | £ | | | | |
| 3,000 | — | 30,211 | 30,211 | 30,211 | 30,211 |
| 700 | 3,000 | <i>252,283</i> | <i>282,494</i> | 178,489 | 208,700 |
| 600 | 700 | <i>30,243</i> | <i>312,737</i> | 47,400 | 256,100 |
| 500 | 600 | <i>48,304</i> | <i>361,041</i> | 70,100 | 326,200 |
| 400 | 500 | <i>77,437</i> | <i>438,478</i> | 112,400 | 438,600 |
| 160 | 400 | <i>751,522</i> | <i>1,190,000</i> | 1,041,400 | 1,480,000 |

The figures in Columns (1) and (4) are plotted in Diagram B (see line C C'). For purposes of comparison a segment of line A A' from Diagram A is also plotted.

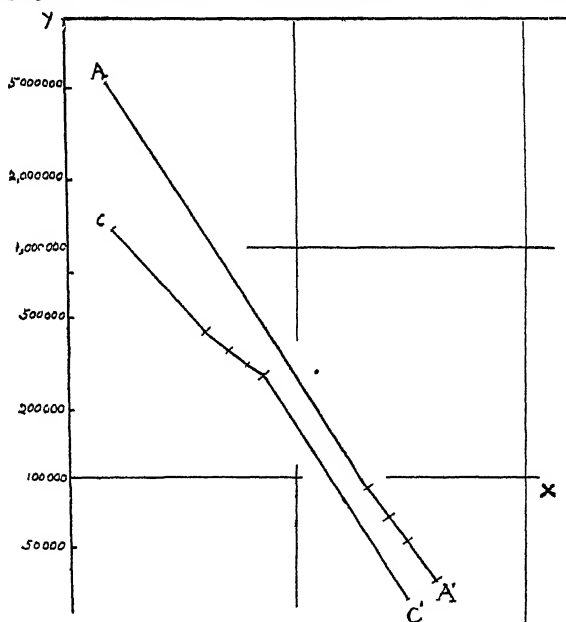
The bulge of line C C' towards the line A A' is very pronounced, and this fact, taken in conjunction with the other considerations alluded to above, has induced me after some hesitation to reject the figures.

The official statistics referred to in this paper were taken from the *Annual Reports of the Commissioners of Inland Revenue* and the
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Statistical Abstract for the United Kingdom, supplemented by Sir Josiah Stamp's *British Incomes and Property*.

Very little has been published with regard to the distribution of income for the post-war period. A few scattered hints are given in Sir Josiah Stamp's works, especially in his *Wealth and Taxable Capacity*. In 1926 articles on the subject by Professor Procopovitch

DIAGRAM B.—To illustrate the bulge in Curve CC' (See Diagram A) if the Inland Revenue Department's Estimates of total number of tax-payers and abatements on small incomes in 1913 are accepted.*



References.

and Mr. Pethick Lawrence appeared in the *Economic Journal* (see Vol. XXXVI. pp. 69 and 302), but these only referred to super-tax payers.

Professor Bowley and Sir Josiah Stamp's *National Income, 1924*, has been drawn upon for data relating to non-personal income and earnings of the working classes. For matters referring to taxation the Report of the Committee on National Debt and Taxation should be consulted, together with a paper by Mr. Caradog Jones read before the Society on 21st June, 1927 (see Vol. XC. pp. 685-728).

* Owing to an oversight the scale along the x axis has been omitted. The scale should, of course, read from £100 to £10,000.

DISCUSSION ON MR. CONNOR'S PAPER.

SIR JOSIAH STAMP: It gives me peculiar pleasure to propose this Vote of Thanks to Mr. Connor for his paper, for two or three reasons. This is a pretty forbidding subject for anyone to take up. It is a very essential subject, but not a very inviting one, and the thorough way in which Mr. Connor has tackled it has left all people interested in the subject under a debt to him for his paper, which must have entailed a good deal of work. In the second place, Mr. Connor has not been frightened to acquire a certain technical equipment of knowledge necessary to avoid obvious pitfalls, and he has also brought a nice judgment and mathematical equipment to bear upon it.

There are few enough people working in this particular field in a skilled way, and every addition to the ranks is welcome. The paper will serve two useful purposes—as material for those working on the subject and for comparison in years to come—there will be in our Journal a most useful piece of work for reference. It will also serve as a warning to people who want to rush in and derive conclusions from a rapid survey without realizing that there is a tremendous amount behind to be looked into before inferences can be drawn.

There are many technical points upon which one might comment, but it is essential to keep a distinct line between two classes. There are those criticisms and adjustments which are absolute in their effect, and there are those which go all the way down and affect the distribution equally. One might make a comment on the evasion and avoidance of income tax, but if one correctly asserts that it applies all through alike, one realizes that it does not seriously disturb the main argument of the paper. But I do not think it would be quite right to assert that, for I think there are many ways which might apply to the higher incomes but which might not be the same all the way down. For example, the super-tax statistics are affected by devices for retaining income in private companies etc., and this would not necessarily be a tendency proportionate to income right down. The corrected line would not be an absolutely parallel line all the way down, but would join the other midway. That is by the way; the great essential to remember is that when criticizing we should not raise all kinds of small points that go all the way down the distribution and do not touch the main inference of the paper. Therefore I would draw a definite distinction between the first paragraph, in which we are told that there has been a significant change in the distribution curve for the income of the United Kingdom, and the consideration of one sample stage of income as an absolute example in itself. The inference seems to me to be perfectly valid from the paper, and any amount of individual points will not disturb it. But if you go on to draw conclusions from one sample as an absolute figure in itself, and say that as a fact an income of so much formerly paid such and such a percentage and now pays another percentage, that is indefensible from this evidence, for then you are in the region of absolute errors which

affect the examples and alterations. I will not spend time in raising a number of points of that kind.

I would like to refer to the way in which Mr. Connor has got rid of the bulge. Everyone knows that if one works at the distribution from the top downwards, and then from the bottom upwards, the two will never meet. Professor Bowley first tackled the problem definitely, and he gave an ingenious explanation of his own in the *Quarterly Journal of Economics*. Others have got rid of the bulge in various ways. People who have rushed in on this—journalistic writers—have had a “hunt the slipper” game for this bulge of income. If they started from the bottom they said all this missing income belonged to the rich, who had more than they should, and if they started from the top, they said it belonged to the working classes, who were much richer than they were thought to be. One way of explaining it is to say that the figure of the smaller incomes of 1913 were greatly understated. Personally I do not quite agree with Mr. Connor’s reasoning. His is only one hypothesis out of several. In 1913 I was a member of the Inland Revenue with a staff of, say, 600 officers, and Mr. Connor’s statement is therefore really an assertion that on an average we missed 500 tax-payers each. I could not own up to such an unthinkable thing, and do not think it possible that so many could have been missed. The number is far too great in proportion to the numbers actually in that sphere to be a satisfactory amount.

There is a very important section which leads direct to the final inference under the rather unfortunate term of “inflation.” Perhaps it is better to use the word “double counting.” Professor Bowley and I arrived at the broad conclusion that the distribution had been altered in favour of the working classes. By double counting you mean one thing when dealing with the national income as a whole, but I am not sure that it means the same when dealing with distribution. You cannot have a situation in which you can have national income high or low according to whether the debt is great or small. This view is not universally accepted; certain American writers protest. Wilford King has said that an income derived from debt is just as much a reward for services as any other. That may be true in one way, but it cannot alter the fact that you have an arbitrary figure if you deal with it without eliminating double counting. Why is the national income swollen by this method of double counting? It is because we always tax upon the gross that we get double counting. Therefore, taking the nation as a whole, it is clear that the debt interest taken internally is double counted. Mr. Connor does not bring out that in his table he has made an important assumption, that the incomes paid out of this taxation—incomes to individuals from war debt—are distributed from that source closely in proportion to distribution of income. The assumption underlying the table is that it is also double counted for each individual, and there is the same distribution of interest all the way down. That may be the best assumption that can be made, but it fails when you come to deal

with pensions. It may be true that the income of a man with £1,500 is swollen to £2,000, but you cannot say that about pensions which as a burden get distributed the whole way down the table but come in as income all at the bottom. They are of two different orders altogether. I rather imagine that the fraction of $\frac{371}{6\frac{1}{4}6}$ may be wrong, because in the distribution no part of the undistributed non-personal income is included, whereas that non-personal income bears its share of the total debt of the pensions. It might be advisable to reduce the figure of £371 millions.

I said I would not refer to points that touched upon the accuracy of particular statements. I would like to say, however, that the declarations of total income for super-tax, the methods accounting for bonus shares, etc., have a considerable influence on distribution in the upper classes.

I am not sure whether it would not be a good thing if Mr. Connor were to test his results and present his curves in an alternative way. If he reduced his 1924 incomes to 1913 terms at each stage by the ratio that the two *aggregates* bore to each other, or if he reduced the 1924 figures to 1913 terms on a price index, then he would get his two lines super-imposed, crossing in the middle, which would correspond with his final results. I think the result would be clearer that the rich people were not so well off.

For the whole paper I have nothing but praise and congratulation. I have much pleasure in moving a Vote of Thanks to Mr. Connor for his valuable contribution.

MR. W. H. COATES: I have much pleasure in seconding the Vote of Thanks which Sir Josiah Stamp has proposed to Mr. Connor. I much admire the way in which Mr. Connor has treated this subject, and the terse and concise manner in which he has presented his conclusions and made them so very evident. He had a difficult task, because of the persistently bad habits of the Inland Revenue Department—for which Sir Josiah Stamp and myself must bear some responsibility during previous years. Now that we can shake off any such responsibility there is no reason why we should not take an opportunity of saying publicly how very desirable it would be that the Inland Revenue Department should, in these days of difficulties, open its coffers and extract at any rate some portion of its very large treasure of statistical material, bearing upon some of the most important elements of national life. In this way it could give us unique aid in making up our minds on the problems with which we have to deal. Occasionally I am asked in what book information as to incomes, their total and their distribution, can be found, and when I explain to people that it can be found in no book, not even in the publications of the Inland Revenue Department, there is very great astonishment.

As regards the paper itself, I think the general results are what might have been expected. Certainly my own experience in the Inland Revenue Department had given me information which made the results of this investigation no real news to me. I should like to

run over one or two things which do affect the question. In the first place, the national income, when you have taken out the effects of double entries, is to-day not as much as it was in 1913. 1913 was a year of prosperity. 1924 was still a year of considerable depression. We have also lost a certain amount of foreign investments abroad, and those who looked into statistics of the trade balance also know that the returns we had been receiving on foreign investments abroad had not grown at anything like the ratio at which the price level in this country had moved. We have a definite loss in that respect. Again, taxation is being levied on a different level from what it was before the war. In order to raise large sums for debt interest, etc., progressive taxation has been adopted and carried to a high degree, and it is quite clear that much of the tax has been paid by people with the larger incomes who have received it back again in the form of debt interest.

There is a much larger expenditure to-day on Health and Education services, part of which is drawn from the progressive direct taxes, and so partly transferred from the upper classes to the lower. The Colwyn Committee's conclusions also bear out the results which Mr. Connor has produced in his paper. Then, again, the rate of interest has not increased in the same ratio as the cost of living. In another sphere there are the effects of the Rent Restriction Act, which has conveyed real income into the pockets of the less wealthy classes at the expense of others.

Analysis of such material as is available relating to the total assessments under Schedule D. of trade profits, using some of the information given to the Royal Commission on Income Tax, leads one to believe that the total volume of trade profits has not risen in the same ratio as the price level. During the time when the price level was rising very quickly in 1919-20, there were very general increases in the salaries and wages which, when the price level fell, displayed a tendency to remain high, and therefore tended to affect the amount of profit remaining for the Company and the shareholders.

As regards Mr. Connor's use of the Pareto index, I admit that this may be the only means available in the circumstances, but as yet we have no real proof that the Pareto index will work accurately all the way along the line, like the laws of the solar system. I think it is probably doubtful that the dispersion on either side may be considerable and vary from year to year. If you catch the dispersion in two different moods you may get a much greater change than you expected.

As regards Mr. Connor's 1913 figures, I notice he has imported 290,000 new tax-payers. Here Mr. Connor has a serious difficulty to contend with. If he taxes these gentlemen and works out their abatements on a reasonable sort of basis, he will find he has more tax than was actually produced; that is to say, he has increased the number of tax-payers, but he had not provided any additional net increase of tax.

The estimates which the Inland Revenue authorities make have to fit over a great number of cases; they are not satisfied with their

estimates unless they meet all the tests that outside critics are likely to make, as well as certain internal tests. The relative movement of individual incomes is not the sole variable to be considered. The evidence presented to the Colwyn Committee showed that Companies had considerably increased their reserves since 1912. This factor has to be taken into account in reckoning the percentage increase of representative individual incomes. To many shareholders it does not make a great deal of difference if they get a little less dividend provided that the Company is prosperous and the capital price is rising day by day. A good many shareholders prefer it. The individual forgets all about the income tax and reckons the capital increment as something very desirable; he may be able to turn it into cash if he gets bonus shares.

I should like to emphasize Sir Josiah's point as regards the £93,000,000 taxation for pensions. Correction of this item takes away a quarter of the £371,000,000 total tax. That would move the increase in the highest range from 90 per cent. to 100 per cent.

I think there are additional points for consideration; for instance, the amount of taxation taken to pay debt interest covers, of course, the interest which is received on Government holdings, and Sir Otto Niemeyer told the Colwyn Committee that that amounted to about £150,000,000. Again, no income tax is deducted from a large part of the interest, some of which is received by foreigners, on whom there is no obligation to pay tax.

There is one other point; transferences of income, such as the adoption of the Burnham scale of teacher's salaries, have had an effect on the increase in the lower range of incomes. Though this may not increase the actual real production of goods and services, it increases nominal incomes by paying more for services, and making no corresponding deduction from the income taxed.

I should like to close my remarks by again expressing my admiration of the ability and skill with which Mr. Connor has dealt with this most difficult subject.

PROFESSOR BOWLEY said he had very little to add to what the two previous speakers had said: some of what had been said he had intended to say himself, and he especially wished to join in congratulating the reader of the paper upon having thrown new method and new light upon an extremely difficult problem.

Referring to the bulge in the income curve to which Sir Josiah Stamp alluded, it was clear from some of the figures given by Mr. Connor that in between the positions the £700 and £3,000 there was much more income than one would have expected to find. Unknown tax-payers or discontinuity of income had to be introduced. Sir Josiah Stamp had mentioned a way of explaining it, but Professor Bowley did not feel sure that one was bound to give an explanation. The applicability of Pareto's law to incomes was purely empirical. Some hypothesis of distribution of inheritance and earning power which led to this law had been suggested by an Italian writer, but Professor Bowley did not regard it as satisfactory.

If one was unable to show *à priori* that incomes should fit Pareto's law, then one was free to take the distribution as it appeared, examine it, describe it, and try to account for it in some other way. In this particular case—the difference between £700 and £3,000—Professor Bowley said he would feel satisfied if he could get any law of continuity which would pass from one line to the other. The suggestion he made was that if Pareto's law was applicable, or any continuous law of distribution was applicable, the same constants in the equation were not to be expected at the two extremities. The high ranges of income were to a large extent from property—the low ranges to a large extent from earnings. The income from the latter was arbitrarily stopped at £160 in 1913, and still more arbitrarily at £147 in 1924.

Professor Bowley thought that if Mr. Connor gave up the idea of the necessary applicability of Pareto's law, some of his difficulties might disappear. He was not bound to create 290,000 tax-payers. It was not necessary that they should have existed for his purpose—they were only a working figure in order to enable him to obtain some others. There were some ways in which it would be possible to bring the two numbers which he expected to meet at the end, a few steps nearer one another. One which Professor Bowley thought to be justifiable was to compare the number of tax-payers in 1913, not with the same number in 1924, but to allow for a growth corresponding to a growth of population—to range the people on an increased total. Mr. Connor spoke of the number of incomes being practically the same, but Professor Bowley did not think he was justified in assuming that the number of *higher* incomes was the same. It was probable that with the change in distribution by age due to the losses in the middle years of life and prolongation of life in the higher ages, there might be some definite effect in the direction of increasing the number of higher incomes which would have some small effect on the percentiles. There was also the possibility of pushing some of his margins in this direction so that there would be a smaller discrepancy; for, after all, if one did not feel oneself bound to assert that a lower number of incomes followed a preconceived curve, that difficulty of the malfitting of the curve disappeared, and the main difficulty was that the margin of income tax-payers had increased by 155 per cent. in the eleven years, and it should not have done so. Professor Bowley felt that one was at liberty to push all the doubtful parts of the system about in order to try to see if it were conceivable that the number should be lower.

On page 64 the estimate of the average increase of wages was given as 95 per cent.; no doubt this might be accepted as an average, but various sections of the working classes have increased their wages in the different proportions; the lower and unskilled labour had increased more than the average, but it was possible that the better paid wage-earner had done as well as the worst paid, and that it was only the moderately skilled man who has done badly.

Finally, Professor Bowley said he would like to congratulate

the reader on introducing what was, in fact, a new method of testing inequality of income. No one had succeeded in obtaining a single index by which one could say that incomes were distributed more evenly or not. He did not think there could be any single index, but this device of percentiles was a good device, answering some part of the question whether the inequality of incomes had increased or diminished. If the movement of the percentile incomes went regularly from the top to the bottom, then there would be a definite indication of the nature of the change; whereas if there were definite discontinuity, then it could be said that there was no single answer to the question.

Mr. BECK said he would like to add his congratulations to those tendered to Mr. Connor for his interesting paper. His Table C was of great importance, and so far as Mr. Beck was aware it was the first attempt to make a precise measurement of this comparison, which showed—as no doubt many members of the Society had already felt to be the case—that the increase in current incomes as compared with pre-war years is greater in the range of the smaller tax-payers than in that of the larger tax-payers. Although this was well known, the table was specially valuable in demonstrating that the effect of the post-war progressive taxation had further accentuated the difference in the increases when related to the net income remaining after payment of income tax and super-tax, and if one could take account also of the death duties in terms of an annual tax, the disparity would be still greater.

While commending the paper as a whole, there were a few points open to criticism, which while modifying the various statistics would not invalidate the main conclusion. He did not quite understand Mr. Connor's reference to the change in the method of assessment to income tax. The assessment in 1913 was based on exactly the same machinery—taxation at the source plus returns of salaries paid to employees. There was no change in the method in 1924, and it was therefore difficult to see why it should be supposed that the 1924 machinery brought in more people. Coming to some of the figures, the official estimate of 1,190,000 in 1913 has been altered to 1,200,000 as published in recent Reports of the Commissioners of Inland Revenue. Mr. Connor, however, questioned the accuracy of this estimate and substituted for it his own estimate of 1,480,000. The official estimate must have some margin of error, but it did not seem possible that the error would be so large as 20 per cent. The official figures had to pass several tests, as Sir Josiah Stamp mentioned, not only having to fit the total income assessed, but also the amount of income charged at the various rates in the different ranges of income, the total abatements allowed and the tax finally paid, and an estimate which could stand these tests was not lightly to be cast aside. It seemed to follow that the Pareto curve could not be adhered to as an absolutely rigid formula, as the studies of Sir Josiah Stamp and Professor Bowley had shown, and that some margin of variation must be allowed.

He observed also that the figures given for the super-tax incomes in Table B for 1924 were not the final figures which would ultimately be assessed, as they were taken from the table on p. 102 of the 69th Inland Revenue Report, which dealt only with the assessments made up to 30th April, 1926. There remained four more years in which assessments could be made, and the final totals were therefore likely to be much larger. In fact, the table on p. 101 of the same Inland Revenue Report showed that the ultimate figures anticipated were 97,000 individuals with an income of £558,000,000 for the year 1925-6, which represents income assessed to income tax in 1924-25. The whole of this income was included in the income tax assessments for 1924, and therefore these figures should be substituted for those in Mr. Connor's Table B.

Then, again referring to non-personal income, Mr. Connor put this at £245,800,000. In the table on p. 112-13 of the 64th Inland Revenue Report, the non-personal income was put at £260,000,000 for 1919, and of this it was stated that about two-thirds represented companies' reserves, leaving one-third, or £80-90 million, for other items, among them being income on invested funds of insurance companies, income accruing to residents out of the United Kingdom, etc. If £90,000,000 was taken for these items in 1924, and there was added £217,000,000 for companies' reserves (the estimate given in the Report by the Colwyn Committee on the National Debt, p. 18), one reached a total of over £300,000,000, which exceeded Mr. Connor's total by over £50,000,000, and this excess would come out of the personal income in the classification he had given for 1924. The correction for this item, and for the too low super-tax income referred to before, might make a little alteration in the slope of his curves.

As regards 1913 also, Mr. Connor's non-personal estimate of £112,600,000 seemed too low. The Report of the Colwyn Committee already referred to gave an estimate of £102,100,000 for companies' reserves in 1912, and if account is taken of the other items, such as income on insurance funds, etc., the total should probably be about £140,000,000, or about £30,000,000 more than Mr. Connor allowed. This would reduce the income assigned to individuals in 1913 in Mr. Connor's Table A, and should therefore make it easier to keep nearer the official estimate for that year and to reduce the "bulge" mentioned by Sir Josiah Stamp. These adjustments might modify slightly the comparative figures in Table C, but the broad result would remain the same.

As regards the comparison in Table C, he suggested that he would like to see a comparison done by groups of tax-payers rather than by single incomes. For instance, if one took the top 1,000 tax-payers in 1913 and compared them with the top 1,000 in 1924, and then took the next 10,000 tax-payers and compared them as a group. This method did not look at the individual change, but at the change in the group as a whole. Moreover, he thought it simpler to deduct the total direct taxation borne by the group rather than enter on the thorny path of trying to allocate a definite part of certain taxation to debt interest, etc. This would conform to the view of the ordinary

man, who was prone to look only at the total tax paid. He suggested to Mr. Connor that a comparison on those lines would be very instructive. He had not been able to prepare any elaborate statistics, but looking at the super-tax assessments for 1914-15 and 1925-26 (corresponding to income assessed to income tax in 1913-14 and 1924-25), they seemed to yield the following rough results:—

| | | | | Income. | Direct Taxation. | Net Income. |
|-------------|-----|-----|-------|---------|------------------|-------------|
| | | | | | Million £. | |
| Top 1,000 | ... | ... | {1914 | 55 | 7 | 48 |
| | | | {1925 | 77 | 34 | 43 |
| Next 10,000 | ... | ... | {1914 | 110 | 12 | 98 |
| | | | {1925 | 165 | 55 | 110 |

Though rough and ready, these tend to confirm Mr. Connor's thesis, in that the increase in the income (before taxation) of the top 1,000 was about 40 per cent., while the next 10,000 showed the larger increase of 50 per cent., and if this group comparison could be continued downwards, no doubt it would show progressive increases, as in the examples of specimen incomes in Mr. Connor's Table C. The comparison of the net income after taxation is very illuminating, for the top 1,000 showed a decrease of 10 per cent. and the next 10,000 showed an increase of only 12 per cent., thus demonstrating that the progressive taxation combined with a smaller growth in total income had cut so heavily into the net income of these groups that they had in 1924 only about the same nominal net income as in 1913, although prices were some 70 per cent. higher.

In conclusion, though making these criticisms, he should again like to thank Mr. Connor for his interesting and stimulating paper.

SIR BERNARD MALLET said that before putting the Vote of Thanks to the meeting he would like to add his congratulations to those accorded to Mr. Connor, and also to congratulate him on the eminence of his critics. He certainly had had the best authorities in the kingdom to open the discussion, and he did not wish to spoil the record by saying anything himself, but the paper was an interesting supplement to the paper read before the Society in June on pre-war and post-war taxation. These papers together formed a very valuable contribution to a subject which was of actual importance to all, and ought to be of use to people for future reference.

The Vote of Thanks proposed by Sir Josiah Stamp, and seconded by Mr. W. H. Coates, was now put to the meeting and carried unanimously.

MR. CONNOR replied, expressing his appreciation of the remarks made by the proposer and seconder of the Vote of Thanks, and other contributors to the discussion. He had gathered several

valuable hints upon which he wished to reflect, and he would reply on technical matters in the *Journal*. As regards general matters he did not wish to throw any discredit upon the Inland Revenue Department, nor to imply that in 1913 there were potential taxpayers who, owing to ignorance or carelessness, were not caught. All he wished to suggest was that the additional taxpayers might have materialized had the 1913 assessments been conducted upon 1924 principles.

He would look further into the question of reconciling the figures without doing too much violence to the official estimates, but in the meantime he would point out that even supposing substantial variations were necessary in his figures, there would be little difference in general results, for liberal allowance had been made for probable errors. There was a great deal that must be hazardous in calculations of this kind, and in summing up the position he had not ventured upon any exact statement as to the percentage increases in income received by the respective taxpayers, but had confined himself to broad generalizations.

Mr. Connor has since written as follows :—

“ In view of the weight of expert evidence brought against me, I should wish to modify the terms of my suggestion as to the 290,000 additional taxpayers in 1913, to the extent of regarding it as a convenient working hypothesis instead of a statement of actual fact. Curves AA' and CC' of Diagram A would then express an hypothetical tendency of income to distribute itself according to a regular law, supposing that irregularities due to special causes as well as to fluctuations of sampling could be eliminated. Measurements can then be taken from the hypothetical curves on the ground that judgments based on these will on the whole be more significant than judgments based upon the fragmentary and unsatisfactory original data. It is needful, of course, to make sufficient allowance for probable errors, and this has been done.

“ For the benefit of those who wish to know the actual distribution of smaller incomes in 1913, I would point out that the adjusted and the unadjusted curves cross near the £400 point, so that a true figure of 438,000 taxpayers with incomes of £400 or above in 1913 may be considered highly probable.

“ The problem of double-counting in 1924 requires further elucidation. Curve AA' of Diagram A includes income from debt interest, but not income from pensions, which are not assessed to income tax. Curve BB' shows the position after deducting from each taxpayer's income as much taxation as is assumed to represent his contribution towards national expenditure on debt interest and pensions. Strictly speaking, a further adjustment should have been made by adding back to the income of each taxpayer his estimated share of pension. This last step was omitted, on the ground that the amount distributed in pensions to the taxpaying class is small, and can be ignored in comparison with the probable errors in their incomes. Approximately speaking, this method credits or debits

each taxpayer with the difference between income and outgo under these two heads, and does not appear to me to involve any special assumption on the score of distribution, beyond the minor point to which I have drawn attention.

"Sir Josiah Stamp's warning that consideration of sample stages involves one in absolute errors is one to which I heartily subscribe. I take this as emphasizing that our figures must serve as the foundations of judgments and not as the judgments themselves.

"Mr. Coates has given substance to my arguments from his expert knowledge and I am obliged to him for drawing attention to two points on debt interest that had been overlooked.

"Professor Bowley has made some illuminating suggestions with a view to resolving my special difficulties. At the moment, however, I cannot find a definite basis upon which to proceed with them, and I shall have to reserve the matter for further study.

"I must thank Mr. Beck for throwing light on a number of troublesome points. I agree that group comparisons would have been preferable, but this procedure would have meant parting company with the figures in the Colwyn report. I avoided the question of total taxation, partly through fear of overloading the paper, and partly because it would inevitably attract further problems, such as local rates and subsistence minima, upon which I had not reached definite conclusions.

"I have not attempted to revise any figures at the present stage, seeing that none of the changes suggested would affect the substantial accuracy of my final summary, and that no revision can be thoroughly effective until the final figures of the Inland Revenue Department and the final results of the Census of Wages, 1924, come to hand."

After the meeting the following comments on the paper were received by the Hon. Secretaries :—

One point seems to be brought out very clearly in Mr. Connor's paper. It is that the Board of Inland Revenue in their Income Tax Branch possess an organization which, if its statistical activities were extended and developed, would prove of incalculable value in dealing with the problems affecting the economic life of this country. Perhaps it is not too much to hope that one day the Board of Inland Revenue will collaborate with the Board of Trade and issue joint statistics and information relating to the results of industrial and commercial trading.

It has been suggested that the Accountancy profession is in possession of vital information in this connection. There are, however, great difficulties in the way of making this information available for the use of the State in the form required. To a large extent the information is also possessed by the Income Tax authorities and, what is of equal importance, they have the machinery for turning it to great practical advantage. There would, of course, be opposition to any increase in the number of Government servants

necessary to deal with the matter, but if it could be shown that real solid advantages would ultimately result, the opposition would probably cease.

GEO. W. BASSETT.

One of the conclusions I draw from this Paper is that the official statistics are inadequate even for guiding public policy in the matter of taxation: no case for the relief of the super-tax payer can be clearly made out from them, except by endeavouring to turn inferences into deductions. The advantage of the double logarithmic curves is that they smooth out both the major and minor inequalities, and adjustments involving large quantities can be indicated without revealing to the eye how distorting such adjustments may be.

In attempting to bring such curves into parallel, the operator has the option of adding to or subtracting from either or both. It seems to me that a valid argument from the premises could be presented by similar means for the exactly opposite conclusion. Mr. Connor's method seems to be that of a man who enters a room and, producing his watch, looks at the clock, and confidently avers that the clock is wrong. This, however, does not prove that his watch is right. The critic has the option of declaring that the watch is fast or slow, and the audience will be disposed to accept his dictum.

Now, all Government statistics, dominated as they are by a desire to support the official theory, are extremely likely to be insufficient for other purposes, and any critic can smooth them out, interpolate or amplify *ad lib.* for the critic's own purposes. My suggestion is that the Government should be required to publish figures in a form which would make Mr. Connor's elaborate analysis and reconstruction unnecessary and superfluous.

DUDLEY W. WALTON.

As a result of the ballot taken during the meeting, the candidates named below were elected Fellows of the Society:—

Philip Arthur Harrison Bromwich.
John Alfred Chamberlain.
George William Thomas Coles.
Louis Donavours-Hickie.
Francis John Dudley.

George Frecheville, M.A., B.Sc.
Cecil Oswald George.
Cecil Edward Holding, LL.D.
Reginald Carey Reynolds.
Walter Linford Tomlin.

MISCELLANEA.

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GRAUNT AND PETTY.

By M. GREENWOOD.

THE publication of the Marquis of Lansdowne's copious selection from the unprinted papers of his illustrious ancestor * is something of a literary event. The event is particularly interesting to statisticians, although, of course, Lord Lansdowne's selections are not confined to matter only of statistical interest, and his two handsome volumes supplement in all ways Lord Edmund Fitzmaurice's biography and Dr. Hull's edition of the economic works of a man who founded a family and helped to found the Royal Society.

This new material will not, I think, much alter the impression that the previously known facts about Petty have created. The impression, on the mind of the present writer at least, was this. Petty was a man of great natural ability and, in the conduct of the practical affairs of life, displayed much sagacity and determination, qualities which enabled a poor village child to die a great landowner. Great fortunes have been seldom made, even more recently than in the seventeenth century, by fastidiously scrupulous men, and there is plenty of evidence that Petty lost no opportunity of pushing his claims, but no trustworthy evidence that he ever fell below the ethical standard of his time. Intellectually he bore some resemblance to a more famous architect of his own fortune, Henry Brougham. He had the same genuine curiosity, the same—indeed rather more—prescience in matters on the borderland of the purely intellectual and the practical, the same wide but superficial learning, while in worldly wisdom Petty was far superior to Brougham. In these two volumes

* *The Petty Papers*: Some Unpublished Writings of Sir William Petty, edited from the Bowood Papers by the Marquis of Lansdowne. Two volumes, large octavo, xii + 309 pp. and 276 pp. London, 1927 (Constable and Co.), price 52s. 6d. net

of private jottings there is hardly a topic within the range of intellectual interest of the time upon which Petty did not find something to say, not for the purpose of showing off (a vice of Brougham's), but because he was really interested. Here is Latin verse and prose (both bad, although some of the worst parts may be a consequence of bad eyesight and editorial leniency), a dissertation on algebra which, according to the editor, was well thought of by the author's friends, but would certainly not have seemed to Wallis or Newton worth the trouble of committing to paper, natural history and physiology not up to the standard of Ray or Mayow, clinical observations which do not rise above the level of any intelligent seventeenth-century practitioner, and, last but certainly not least, economical-political notes of much greater interest. All that is of serious value is derived not from the slow, sure movements of a profound and highly-trained intellect, but is the enthusiastic outpouring of a quick, practical intelligence. There are dozens of suggestions for doing something; many of them—for instance, the suggestions for establishing isolation hospitals and a council of health in London—may be fairly regarded as anticipations of what has actually been done since, but there are others which deserve the comment of his descendant upon one: "Petty's calculations in the foregoing paper seem totally unintelligible. He was evidently carried away by his enthusiasm for the great project of 'Transplantation.'" Nowadays not even a sharer of Macaulay's or Thomas Love Peacock's antipathies would deny that Brougham was a great man, if by great we mean one whose intellectual powers and achievements considerably exceeded the average standard of his contemporaries. Tried by that standard Petty was surely a great man; he not only succeeded in his career but gave others, including the king, excellent advice. But, arguing from his acknowledged work, it would hardly seem more likely that Petty was the author of a closely reasoned and critical scientific memoir than that Boole's *Calculus of Finite Differences* was a parergon of the "Learned Friend" which he had persuaded an obscurer person to father. Lord Lansdowne, however, submits evidence which, in his opinion and that of most of his reviewers in the lay press, leaves "no reasonable doubt" that Petty was the author of one of the classics of statistical science, *The Natural and Political Observations on the London Bills of Mortality*, published over the name of John Graunt. Writing in a statistical journal it is unnecessary to dwell at length upon the characteristics of this work, but, to make the discussion of its authorship clear, something must be said.

Graunt's book owes its place in the esteem of statisticians to three principal reasons. The first is, of course, that the writer seeks to

obtain, and does obtain, interesting and important results in a field previously uncultivated, but that may also be said of Petty. The second is more individual, viz. the writer's application in this new field of medical and vital statistics of the critical method which, before him, had hardly been used at all save by the best of the humanists, by a Scaliger or a Casaubon in textual criticism. One notices a caution in weighing evidence and a habit of collating different methods and results not always found in the *Philosophical Transactions* themselves and almost absent from the enthusiastic jottings of Petty. An excellent illustration is afforded by the way in which the author of the *Observations* goes to work when he asks himself whether a new statistical item is really a "new disease" or only a result of the re-sorting of old items. For instance, he finds Rickets for the first time in the Bills of 1634, and at once asks "whether that disease did first appear about that time; or whether a disease, which had been long before, did then first receive its name?" He then asks what other casualties named in the Bills before might be most like the Rickets, and concludes, both from the information he received from "Pretenders to know it," and also from the fact that in some years Livergrown, Spleen and Rickets were grouped together, that "Livergrown was the nearest." He then compares the Livergrown of the previous year with the Livergrown plus Rickets of the following year, and concludes that Rickets is really an addition, but he adds the caution, "only this is not to be denied, that when the Rickets grew very numerous (as in the year 1660, viz. 521), then there appeared not above 15 of Livergrown." Whether the author were right in concluding that the Rickets was a new disease is not now of importance, what is of importance is to mark the originality of method; it is relevant to note that had William Heberden the Younger, one of the most accomplished physicians of his day, writing more than a century after Graunt's death, really understood that author's method he would not have made a blunder, subsequently exposed by Creighton,* respecting the decline of dysentery.

Another example of careful collation of evidence is in the eleventh chapter, where the author compares the different methods of estimating the population of London. This chapter also makes good the third of the author's titles to veneration, that he forged new tools of research, for it contains the first London life table. This matter is of sufficient historical interest to justify a digression. The author, having concluded from his data that 64 per cent. of the live-born survive to the age of six and that approximately one per

* W. Heberden, Jr., *Observations on the Increase and Decrease of Diseases, particularly the Plague*, London, 1801. Creighton, *History of Epidemics in Britain*, Cambridge, 1894, Vol. II., pp. 747-8.

cent. survive to age 76, asks himself how many will be surviving at decennial intervals. He describes his process in these terms. "We sought six mean proportional numbers between 64, the remainder, living at six years, and the one, which survives 76, and find, that the numbers following are practically near enough to the truth; for men do not die in exact proportions, nor in fractions, from whence arises this Table following." The relevant figures, what we should now call the l_x column, are:—

| Age. | | | | | Surviving. |
|------|-----|-----|-----|-----|------------|
| 6 | ... | ... | ... | ... | 64 (64) |
| 16 | ... | ... | ... | ... | 40 (40) |
| 26 | ... | ... | ... | ... | 25 (25) |
| 36 | ... | ... | ... | ... | 16 (15) |
| 46 | ... | ... | ... | ... | 10 (9) |
| 56 | ... | ... | ... | ... | 6 (6) |
| 66 | ... | ... | ... | ... | 3 (4) |
| 76 | ... | ... | ... | ... | 1 (2) |

In his note on this passage Dr. Hull writes that "this method of constructing a table of mortality suggests Petty's *Discourse of Duplicate Proportion*." Dr. Hull did not show how to obtain the author's table by means of Petty's method, and it is not easy (to judge from the extract printed by Dr. Hull *) to see how this could be done. Petty begins by asserting that there are more people alive between the ages of 16 and 26 than in any other decade, and then announces that "the roots of every number of men's ages under 16 (whose root is 4) compared with the said number 4, doth show the proportion of the likelihood of such men reaching 70 years of age." He also says that it is "5 to 4 that one of 26 years old will die before one of 16; and 6 to 5 that one of 36 will die before one of 26; and 3 to 2 that the same person of 36 shall die before him of 16: and so forward according to the roots of any other year of the declining age compared with a number between 4 and 5, which is the root of 21, the most hopeful of longevity, as the mean between 16 and 26; and is the year of perfection, according to *our law*, and the age for whose life a *lease* is most valuable." It is not (to me, at least) easy to understand how these rules could be applied to reproduce the table of the *Observations*, and I do not understand how that table was really calculated. It may, however, be remarked that the numbers are not ill represented by a geometrical progression with the common ratio 0.62, taking 64 as the first term. The terms of this progression, to the nearest whole number, are shown in brackets above. I do not, however, suggest that this was the author's method. What is,

* *Economic Writings of Sir William Petty*, Cambridge, 1899, Vol. II. p. 622.

however, quite clear is that the author had grasped the fundamental notion of a life table. It is strange, if Petty had made or even realized the importance of this discovery, that neither in his published nor unpublished writings should one find any reference to it. It is particularly strange since what one might call the financial side of the matter, the utility of the instrument in computing the values of annuities and life rents, speedily appealed to men whose financial instincts were certainly not acuter than those of Petty.

In sum, a comparison of the *Observations* with Petty's acknowledged writings puts the whole onus of proof that Graunt was not the author of the book he put his name to upon those who assert it; we are required to believe that Petty not only renounced his right to the credit of having written a masterpiece, but also refrained from the use of new and valuable methods in his other writings. When we further remember that Graunt and Petty were intimate friends, and that there would be nothing inconsistent with the strictest propriety in Petty's both drafting the introductory matter and touching up the manuscript throughout, the onus becomes very heavy.

It does not appear that Lord Lansdowne realizes the nature of the case that he has to meet. His ingenuous remark—in reply to the objection that the style of the *Observations* is unlike that of Petty—"I confess that I cannot perceive this difference, though they are perhaps somewhat better put together than were most of Petty's papers," is perhaps proof enough of this. But his catalogue of parallel passages gives us full measure, brimming over. This catalogue is headed, "Parallel passages in the London *Observations* and Petty's unpublished writings," and arranged in two columns; in the left-hand column we are given page references to the *Observations*, in the right-hand column a subject reference and page references to the present volumes of Petty's papers. The first entry in the catalogue refers us on the left to pp. 320, 385, 394 of the *Observations* (Hull's edition); the right-hand column gives the subject reference, Proportion between Males and Females, and the page references II, 115, 232. On p. 320 (the epistle dedicatory) Graunt mentions as one of his conclusions "that the wasting of Males by wars and colonies do not prejudice the due proportion between them and Females." On pp. 385-6 he challenges the assertion that "there be three women for one man," and asserts the ratio to be 14 to 13; on p. 394 question 2 of the conclusion is, "How many Males and Females?" Let us now take the "parallel" passages of Petty. On p. 115, amongst "Queries concerning the nature of the Natives of Pensilvania," no. 3 is, "What is the proportion between their males and females?" On p. 232—a series of miscellaneous political observations—there is nothing to the purpose until we come

to the last line but one, where we read, "there be more males than females in nature. Beside, a man is prolific 40 yeares, a woman but 25 or thereabouts; which compensates the losse of men by the Sea, War, Exercises, etc."

Now unless Petty deliberately abstained, even in his private papers, from writing about vital-statistical matters at all, it would be very hard for him to avoid providing parallels such as these, and impossible if the notes were made *after* reading Graunt's book. Several of the alleged parallels do not even reach this level and hardly seem worth citation. For instance, on p. 356 of the *Observations* there is a sensible discussion of the statistics of the French Pox leading the author to conclude that then (as, of course, now) the bills under-stated the mortality from Syphilis. Lord Lansdowne refers us to a parallel passage on p. 261 of his second volume. The parallel is this; that in a list of his writings drawn up on October 6th, 1671, Petty entered a discourse in Latin, *De Arthritide et Lue Venerea* (apparently written in 1646). It is a little difficult to take such a "parallel" as this seriously.

In discussing Graunt and Petty one is tempted to apply Graunt's shop arithmetic to evidence, and I have amused myself by statistical classification of Lord Lansdowne's 41 Parallels. Twenty-one of them seem to me of the last-mentioned kind, viz. parallels which are not parallel at all. Ten are of the class of the example first noted, viz. an agreement which would be inevitable when two men wrote upon the same subjects. There are left ten, where, whether by the use of a particular turn of phrase, such as "*ex sponte creatis*" or by a reference to some rather out-of-the-way topic, such as the diseases of Metal-Men, or by the provision of an item of information certainly within Petty's knowledge but less likely to be within Graunt's, there is real justification for enquiry. Now not one of these resemblances or, if the reader pleases, identities has any relevance at all to the *method* of investigation which, in my view, distinguishes Graunt from Petty, and no less than six of the ten are to be found either in the Conclusion or the Appendix (the latter indubitably based upon information supplied to Graunt by Petty).^{*} In other words, Lord Lansdowne's evidence from parallels amounts to a confirmation of what was already probable, viz. that Graunt's manuscript was submitted to his friend before publication, no doubt before formal communication to the Royal Society, and touched up by him.

^{*} That my marking is, at least, not too severe is shown by the fact that Mr. Yule classified the parallels independently and marked 26 as "1," 10 as "2," 5 as "3." Only one of his "3's" occurs elsewhere than in the Conclusion or Appendix.

Lord Lansdowne's new witnesses need hardly detain us. That Petty's friend Southwell conceived the relation of Graunt to Petty to be that of "a dwarf mounted on an elephant" is perhaps only evidence that Southwell was not a very good judge of scientific work—this is the Southwell who was greatly impressed by Petty's solution of an equation of the first degree in two variables. Nor is the fact that a Fellow of the Royal Society named Houghton believed Petty to be the author of Graunt's work of any special interest. It is likely that Houghton was in the same case as Evelyn, Southwell, Aubrey and Lord Lansdowne himself; they could not understand how a London tradesman who actually became bankrupt might have produced a masterpiece, but they could easily understand how a graduate of the university of Oxford who knew all the best people and was brimful of ideas might have done so. As Lord Lansdowne says, "Graunt was no doubt, as we are told, possessed of all the virtues—a man of marked integrity, a good friend, an excellent haberdasher—but for the reasons I have given, I cannot believe that he wrote the *London Observations*." A worthy man, no doubt, in his walk of life, a *very* worthy man, but it would surely be a little absurd to suggest that he was actually a scientific investigator of the first rank. A similar psychological motive has sustained most of the seekers for an author of the works of William Shakespeare. Bacon was not perhaps quite one of the best people, but he was more presentable than the Stratford-on-Avon person, while the latest candidate, the Earl of Oxford, fills all the psychological needs and is actually known to have written verses. Arguments of this class—and, however dispassionately intellectual we may pride ourselves on being, arguments of this class *do* greatly influence all of us, one way or the other—cannot be refuted by any intellectual means. Show, as I think can be shown, that Graunt's *Observations* differ as fundamentally from any acknowledged work of Petty's as a good memoir in the *Philosophical Transactions* of our own time differs from a good leading article in *The Times*; show that (1) Petty's stock of exact knowledge was scanty and (2) the exact knowledge displayed by Graunt must have been self-taught, for it formed part of no existing curriculum and was not to be found in any books, and many people will still be unable to believe that the lion's share of the collaboration between a London shopkeeper who died bankrupt and the founder of one of our great families was the former's.

REVIEWS OF STATISTICAL AND ECONOMIC BOOKS.

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1.—*Frequency Curves and Correlation*. By W. Palin Elderton, F.I.A. 2nd edition. 239 pp. London: C. & E. Layton. 1927. Price 15s. net.

The first edition of this book was published in 1906: it represented an attempt to apply the Pearson frequency curves to the graduation of actuarial data. The book has now been largely rewritten and much enlarged, and summarizes a considerable amount of the work that has been done by the Pearson school of statisticians. The topics treated are—

(1) Frequency Curves, their fitting by moments, the various types, with a tabular synopsis of the different curves that may arise, their graphs, hints on corrections (Sheppard's and Pearson-Pairman abruptness). Clear distinctions are made between ordinates and block frequencies.

(2) Correlation, including both correlation ratio and coefficient, contingency, class index correction for broad grouping, partial correlation and spurious correlation (biased data, correlation of indices), and tetrachoric method based on normal frequency surface.

(3) Goodness of fit.

(4) Probable Errors and Sampling.

(5) A note on the Method of Least squares.

(6) A select bibliography.

(7) A table of $\log \Gamma(p)$ for $p = 1.000, 1.001, \dots, 2.000$, the entry being given to six decimal places.

Controversial points are avoided in the main, as is fitting in a summary of this kind, though where a ruling is necessary the author adopts the Pearson practice and interpretation. The only case where any considerable space is devoted to the work of other writers is in Chapter VI, where a comparison of the Pearson fittings is made in certain cases with those given by two types of Charlier and other continental writers, by Edgeworth's modification of one of these and by Edgeworth's Method of Translation of the normal curve. Here, as elsewhere, fully worked out numerical examples are given, and the conclusion virtually reached is that Pearson's methods and results are more general, straightforward and simple and are generally better.

The treatment throughout is practical, the mathematics required being within the reach of any boy who has done any work at school beyond the standard of matriculation mathematics, including calculus. We have not been able to check any of the many computations for calculations; both in frequency curves and for correlations the author shows how to use a method of continuous summation as equivalents to moments. The algebraic proofs are straightforwardly set out with all necessary steps shown. It is perhaps surprising in these days to find a reference (p. 217) to Edwards's Differential Calculus for B and Γ functions. We have not observed any misprints save on p. 158 (middle of page), where we have $\frac{x_1}{x_3} = \frac{x_2}{x_3}$ for $\frac{x_1}{x_3}$ and $\frac{x_2}{x_3}$ and two slight slips—13 for 15 on p. 197, top line, and "method" misspelt on p. 129, line 10. On one or two pages (particularly, in our copy, p. 168) the type is lightly printed and certain fractions appear without their dividing line.

Though the book is primarily intended for actuaries and the examples are found from actuarial practice, it should be of great value to anyone who needs to use the statistical calculus accurately, whether for economics or sociology, medical, biometric, pedagogic, meteorological or any other science where these methods are appropriate.

F. S.

2.—*A Study of British Genius.* By Havelock Ellis. New Edition. xi + 396 pp. London: Constable, 1927. Price 17s. net.

This book was first issued in 1904 and has now been revised and enlarged by the addition of chapters on the Celtic Spirit in Literature, the Evolution of Painting in England, Genius and Stature, and the Comparative Abilities of the Fair and the Dark.

The basis of the work is the record of over thirty thousand persons in the Dictionary of National Biography. From these the author eliminates, first of all, those whose fathers, at the dates of birth of the children in question, had attained the rank of baronet or any higher rank, i.e., those whose position appears to have been influenced by the accident of birth. Then those to whom less than three pages in the Dictionary were allotted were excluded on the ground that

their place in the world was comparatively small. "Some seven hundred names" were thus obtained. Finally, a number of persons whose biographies occupied less than three pages were included if the writers seemed to consider that their subjects had shown intellectual ability of a high order, and others "who rank chiefly as villains" and those of whom biographical details were lacking were excluded. The result was 975 British men and 55 British women "of a high degree of intellectual eminence," and to these the term "genius" is somewhat loosely applied.

The three-page biography which, with modifications, formed the basis of this study was, of course, arbitrarily chosen, and it would have been of considerable interest if the space-distribution of all those included in the Dictionary had been given. It might have caused the elimination of the term "genius," on the ground that those selected in this way differ only in degree from those less favoured.

Nationality and race, social class, heredity and parentage, childhood and youth, marriage and family, duration of life, pathology, stature, pigmentation, and other characteristics, are then successively dealt with on the data available, and although the author regrets their inadequacy, this feature might have been more strongly emphasized. The author is indeed inclined to give undue weight to very vague scraps of information and too little weight to the possibility that the comparatively small number for whom details are available may not be a random sample of the whole.

The statistical analysis of the data is not very satisfactory, and the author's treatment of stature may be taken as an example. This is given in Chapter IX, which appeared in the original edition, and more fully in Chapter XV in the present edition. Chapter IX deals with 87 cases where the statement as to stature is "definite," and 276 cases where it is "indefinite," all British, while Chapter XV deals with 61 men "whose height is definitely known" and 219 men "who seemed tall, of medium height, or short to their contemporaries." The latter are not confined to Great Britain and range from Alexander the Great to Li Hung Chang. "Definite" is, however, a relative term, for it covers such expressions as "nearly 6 ft.," "over 6 ft.," "about 6 ft.," "barely 5 ft. 8," and "5 ft. 3 or 4." By doubling the "definite" cases the author obtains a total of 341, of whom 142 are said to be tall (above 5 ft. 9), 74 of medium height (between 5 ft. 4 and 5 ft. 9) and 125 are short (below 5 ft. 4), or 41 per cent. tall, 22 per cent. medium and 37 per cent. short.

These proportions are then compared with those found by the Anthropometric Committee of the British Association, but the percentages given, 16 per cent. tall, 68 per cent. medium and 16 per cent. short, are obtained by defining a short man as below 5 ft. 5, not 5 ft. 4. For the classification used by Mr. Ellis the proportions are 16 per cent. tall, 76 per cent. medium and 8 per cent. short. The author then concludes that "there is considerable ground for believing that, while its precise amount may be doubtful, there is really a considerable deficiency of the middle-sized among men of genius."

As stated above, the percentages given by the author are based on a total of 341, but in only 42 of those cases were definite measurements available. As he says, "it is undoubtedly true that such a list is abnormally deficient in persons of medium height, for it more rarely occurs to the biographers of such to mention the precise height," but it is doubtful whether equal weight must be given to the "compensating error" by which "many of the persons alleged to be of middle height were probably tall."

It is clear, however, that the author has taken an immense amount of pains to obtain all the available data, and it is unfortunate that the available information is, in many cases, too slight to support the conclusions which he has reached. D. H.

3.—*Criminal Intelligence*. By Carl Murchison, Ph.D. 291 pp. Clark University, Worcester, Mass.; London, etc., Humphrey Milford, 1926. Price 18s. net.

Dr. Murchison is convinced that much harm is being done by modern propaganda which create the belief that the criminal is feeble-minded and "an individual to be fawned over and petted." His conviction is based upon the examination of the intelligence of some 6,000 criminals in the United States, whom he divides into four groups:—(1) white native-born men, 3,942; (2) white foreign-born men, 761; (3) negro men, 1,351; (4) women, white 85, negro 41. These he compares with the results already obtained by the application of the same mental test—the Alpha test—to the American army, and the conclusion is that the criminals are by no means inferior in intelligence. He does not give any description of the Alpha test, although it seems doubtful whether it is so well known that a description can be dispensed with by the "lawyers, psychologists, sociologists, and social workers" to whom the book is addressed.

He pays considerable attention to the geographical distribution of his criminals in relation to their mentality, and finds, as one would expect, that the "migrants" are more capable than the "stay-at-homes." He makes a few interesting broad comparisons relating to types of crime, recidivism, literacy, age, occupation, religion, seasonal distribution, length of imprisonment, height and weight and civil state. A greater part of the book is taken up, however, with an analysis of the permutations and combinations of these factors, and much of this matter is entirely valueless owing to the small numbers involved. Table after table is given with no adequate discussion of the contents and very little critical appreciation of their relative values. Many of the distributions are given not in terms of cases but in percentage form, so that often the differences shown are quite illusory. The difficulty of interpretation is added to by the fact that the total numbers involved are not always clearly set out.

For instance, it is interesting to learn that the distribution of "migrant sex criminals" in terms of intelligence is "tri-modal in form" (pp. 89 to 90), but one's interest wanes on observing that

the seven groups of percentages are derived from a total of 46 cases.

Again, the division of 253 criminals into eight religious groups and then into six types-of-crime groups does not beget confidence in the conclusions that (p. 145) "the Methodists and Catholics comprise approximately 50 per cent. of the prison population, but commit more than 85 per cent. of all sex crimes. The Presbyterians, Episcopalians and Hebrews are strong on fraud. The Agnostics, Methodists, and Lutherans are inclined to be strong on crimes of physical injury. The Baptists and Agnostics are superior in obtaining property by force. The vast majority of Agnostics follow the law of force—being either robbers or murderers. The Methodists and Hebrews are superior as plain thieves." The author seems to show an unusual restraint in adding "to what extent the mode of the distribution of each religious group reflects a typical characteristic from the history of that religious group is a question that we are forced to leave to the students of ecclesiastical history." It is to be hoped that these students will not expend an undue amount of midnight oil and energy. One could give endless similar examples. In Chapter X Dr. Murchison gives a large number of medians, standard deviations, coefficients of variation, correlation and regression. On the coefficients he makes no comment whatever; on the measures of deviation he remarks that they are given not because he believes them to be "significant and valuable, but in order that this work may be of service to those who do not agree with the writer." He is wrong in imagining that his readers would cavil at a lack of this elementary statistical treatment; they would not quarrel with him even because of the lack of the more advanced mathematical methods involved in the treatment of small samples. But they will quarrel with him over the complete lack of ordinary common-sense in the appraisal of figures without which the most elaborate statistical treatment is valueless.

He concludes the book with a chapter on the fallacy of "maternalism," and provides the state with seven "practical and effective methods for removing criminals from our midst"—for example, uniform punishment for the insane, the feeble-minded, and the young; and the third penitentiary conviction to carry an automatic death penalty.

In form the book has two defects. It has been compiled from numerous contributions to journals and it shows this origin very plainly. Secondly, Tables that are carried on from one page to the next (without even repetition of the headings) are deplorable.

A. B. H.

4.—*Infant Mortality and its Causes. With an Appendix on the Trend of Maternal Mortality Rates in the United States.* By Robert Morse Woodbury, Ph.D. x + 204 pp. 1926. Baltimore: Williams and Wilkins Company. Price 16s.

Most of the material used in this study has already been published in separate reports by the United States Children's Bureau,

and the principal results are summarized in this volume. Investigations into problems of infant mortality are specially difficult in the United States on account of the slow development of registration of births in the States. In 1915 the Birth Registration area was only composed of 10 States and the District of Columbia. For these States, the rate of infant mortality declined from 99.6 per 1,000 in 1915 to 78.7 in 1921, a fall of 20.9 per cent. Most of the decline appeared to be due to improvement in conditions affecting infant mortality, and only a small part could be attributed to improvement in registration. The urban areas appear to have contributed more to this decline than the rural, for which the progress in infant welfare work in the cities is considered to be mainly responsible. It was thought that a study of conditions in certain cities which showed decided contrasts in industrial and social conditions and in the proportion and kinds of immigrant population might help to throw light on the specific influence of each condition on the infant mortality rate. Records for nearly 23,000 live born infants were analyzed. The infant mortality for the entire group was 111.2 per 1,000 births. A preliminary survey showed a number of factors, each of which had some effect on the infant death-rate. These included health of mother, order of birth, types of feeding, nationality, housing conditions, earnings of father and employment of mother during pregnancy. Numerous writers have shown that a high birth-rate tends to be associated with a high rate of infant mortality. This important factor does not appear to have been taken fully into account in this study. In order to isolate the influence of each of the several factors the Westergaard method of expected deaths was applied to the data. A chapter is devoted to the explanation of Westergaard's method. By this method the actually observed deaths in a particular category are compared with those one would have expected to find had the characteristic (*e.g.* age of mother at birth) which led to inclusion in the particular category been quite without influence upon the rate of mortality.

Considerable evidence is given of the superiority of breast over artificial feeding during the early months of infancy. The health of the artificially fed babies appears to grow worse during the first few months following the commencement of early artificial feeding, and deaths are mainly from gastric and intestinal causes. In the data analyzed the French Canadians had the largest proportion of artificially fed infants and Polish and Jewish had the lowest proportion. The prevalence of artificial feeding appeared to be higher in the groups where the father's income was high. It has been observed that different nationalities show the same tendencies as in their native land so far as infant mortality is concerned. An attempt to measure the influence of race led to the conclusion that the elimination of factors such as economic status and type of feeding did not by any means remove the variations which characterized the nationality rates, and race must still be regarded as an important factor in infant mortality, although the exact nature of its influence could not be stated.

The influence of economic position on infant mortality is especially emphasized. "The study of the chain of causation connecting poverty with high infant mortality showed that the responsibility of low earnings extended over the excessive mortality associated with housing congestion and with the mother's employment both during pregnancy and during her child's first year of life. It showed also that a direct relation existed between lack of means and the kind of care available both for the mother during pregnancy and confinement and for the baby during his first year." Adequate and free provision for pre-natal care of the mother and medical supervision of the infant through welfare clinics is advocated not only to reduce infant mortality but also to lessen its dependence upon economic position.

The causes of the low rate of infant mortality in New Zealand are discussed, and a survey is given of the preventive work and its effect on the infant death rate. It is concluded that infant welfare work has been an important factor in causing the infant mortality rate for this country to be the lowest in the world.

In an appendix the trend of maternal mortality and the evidence for its increase in the United States are analyzed. H. M. W.

5.—*Health Problems in Organized Society.* By Sir Arthur Newsholme, K.C.B., M.D. xi + 253 pp. London: P. S. King, 1927. Price 12s. net.

These nineteen Lectures and Addresses are of great interest, being as they are the outcome of the experience of "one who for more than forty years has been engaged in assessing the relative value of public health possibilities and in promoting their realization in actual work." We seem to be breathing the morning air of a new era. In the first address we are told that Roger Bacon, probably writing about 1268, said—"Wherefore, a physician who knows not how to take into account the positions and aspects of the planets can effect nothing in the healing arts except by chance and good fortune." Nowadays, the administrator is much more practical, for he holds that the social sources of disease which it is worth while to tackle must be catalogued (as in the fourth address in this volume) as "Poverty, Alcoholic drinks, Ignorance, and A low Standard of Morality." Repeated stress is laid in chapter after chapter on "the ethical side of public health work." More education is needed and more research; but with this should go the willingness to suspend judgment on problems "in respect of which there exists no satisfactory basis for dogmatic statements. There is at the present time real danger that in place of obsolete dogmatisms of superstition we may suffer from a dogmatism in the biology of human life which will embody an uncertain mixture of science, of half-baked science and of pseudo-science." Extension of knowledge must be sought "not only by means of laboratory investigations, but also by 'field' investigations; including social and sanitary surveys. . . . This branch of research presents the supreme advantage that it is an invaluable means of public health education." Again, "It was the surveys made by the medical inspectors, appointed by Edwin Chadwick in the early

'forties of the last century, which gave the impetus to early English sanitary legislation and local reform." Sir Arthur points out that "The abolition of tuberculosis and syphilis will mean the removal of the two great evils which produce something like one-quarter of all present deaths before old age." Here the way is plainly marked out, if human kind would but follow it. "There must be sacrifice in some measure for all. For the anti-social, whose egoism and selfishness block the way of hygienics and moral progress, this sacrifice must be more or less obligatory: for the majority it represents a real gain in fullness of life." Yet once more. "Among the enemies of the public health, against which we have had relatively little success, are those especially in which character and conduct are concerned." . . . "The formation of character, even more than the cultivation of intellectual powers, is the great desideratum in education." Alcoholic control is discussed, with full knowledge of conditions here and on the other side of the Atlantic, in Chapters XVI and XVII. As regards bronchitis, most forms of pneumonia, influenza and encephalitis lethargica, we have to lament that they have not as yet "in any satisfactory sense become practical problems of public health administration . . . and for cancer our possibilities of prevention are sadly restricted." Considerations such as those arising out of Alcoholism, Syphilis, Phthisis and Respiratory diseases generally lead to examination of the relative rôles of "Compulsion and Education" in public health work (Chapter IX), of the relation between "Government and Conduct" (Chapter X), of the "Limitations of Liberty in commercial life" (Chapter XI), and of the work done in connection with Compulsory Insurance (Chapter XII). The two final chapters contain a discussion of the "Regulation Problem" and of "The unequal social distribution of the birth-rate." Sir Arthur throughout all these addresses and lectures is a convinced optimist. Like Prospero he seems to say—looking into the future of public health—"I promise you calm seas, auspicious gales and sail so expeditious that shall catch your royal fleet far off." The final quotations from Professor Whitehead are very much to the point, as also is his conclusion—"If mankind can rise to the occasion, there lies in front a golden age of beneficent creativeness." Sir Arthur's volume is a work to be read, marked, learned and inwardly digested. W. H. H.

6.—*An Economist's Protest.* By Edwin Cannan. xx + 438 pp. London: P. S. King, 1927. Price 16s. net.

This is one of the most readable of economic works. The reviewer, when he comes to the end, sighs for more, and looks to the future for a sequel.

The book is composed of a miscellaneous collection of writings, not only articles and lectures, but letters, dealing with contemporary matters from 1914 to 1926. To watch Professor Cannan's acute and vigorous mind tackling one question after another is an economic education in itself, and at the same time has some of the personal and historical interest of a diary.

The topics covered are many. One of the outstanding subjects of protest is "nationalist" economics, the attitude of mind which treats economic questions from the standpoint of a single nation and not of human society as a whole. To Professor Cannan the division of humanity into mutually antagonistic sections, anarchically organized, is a relic of barbarism. But it is far worse than in the days of barbarism.

International anarchy must give place to order, or humanity will have to be content with "bare necessities and warfare" (p. 77).

"It was not so, you say perhaps, in the past. No, but only because we did not then possess the more perfectly organized modern State, which knows how to throw into a conflict the whole force of all the inhabitants of its territory."

A favourite target for Professor Cannan's protests during the war was the system of price controls, together with the bad arguments by which they were defended.

In the latter part of the book an increasing proportion of the space is devoted to monetary questions.

It is remarkable that Professor Cannan took two or three years to become aware of the danger of inflation. He dates the opening of his "Campaign against Inflation" from August, 1917, and the few allusions to the subject in 1916 are quite dispassionate.

The explanation of Professor Cannan's tardy realisation of the progress of inflation is to be found in his peculiar views about the nature of banking. He resolutely shuts his eyes to the use of bank credit as a means of payment. Consequently when the Bank of England's balance sheet was swollen with advances on pre-moratorium bills, when the joint-stock banks were induced to make large subscriptions to war loans, when discount rates were allowed to slip down to 3 per cent., 2 per cent., and even lower, he offered no protests.

Bank deposits, he argues, are to us (the depositors) purchasing power, "but power as yet by us unexercised; we have, so far, refrained from exercising the power in our possession; and since it is spending money which raises prices, and we have not spent this money, we cannot be accused of having raised prices simply because we have increased our balances—rather the contrary is the case: by not spending we have tended to reduce prices."

Exactly the same might have been said of money. The money we *have* is what we have *not* spent. If it is true that the depositors have created bank deposits by paying money in, it is equally true that (under a paper-money régime) they have created money by drawing money out.

Money, it may be said, is kept for the purpose of spending. But then so is bank credit.

To Professor Cannan a legal tender law is irrelevant to the real nature of money. "If the people will accept them [coins or notes] without such a law, the situation is exactly the same" (p. 206). It follows that in his eyes bank credit, when transferred by the

instrumentality of a bank-note, is money, but when transferred by the instrumentality of a cheque, is not.

When he says that banks "can lend out of their own capital *plus* what solvent customers lend to them (*alias* deposited with them") (p. 261), he means to imply that what the banks lend is limited by the *money* they receive. But far the greater part of their deposits comes to them in the form not of money, but of bank credit transferred to them through cheques cleared against other banks. Much of this bank credit comes to them, either direct or at one or two removes, from people who have borrowed from these other banks.

What *one* bank lends is limited or very nearly limited by what it receives. What *all* the banks in a community lend is not so limited. This can expand up to the point at which the limits placed by law on the currency are threatened by the drain of currency into active circulation or the outflow of gold or both. The harm was done in 1914 and 1915 because those limits were made inoperative. Professor Cannan believed that the active cause of inflation was to be sought only in the sphere of currency and not in that of credit, and his protest was as tardy as the effects of the inflation upon the currency.

Perverse as Professor Cannan's views of bank credit are, readers will yet derive intellectual pleasure and stimulus from his ingenious and pertinacious defence of them.

One other among Professor Cannan's topics which deserves mention is that of German Reparations. In a few brief passages he disposes of most of the favourite fallacies which have for some time been prevalent even among the highest authorities. Broadly his conclusion is that "if the German Government can raise the required amount by taxation, there won't be the least difficulty about sending it abroad" (p. 352). That was written in 1923, but not at that time for publication; he was "reluctant to do anything which might be taken as support for extravagant demands for reparations." That was not because he shared the doctrine "that it is economically more advantageous to give than to receive an international payment." On the contrary, he calls that doctrine "ridiculous" (p. 321).

R. G. H.

7.—*Die Industriekonjunktur—ein Rechenfehler!* Von Dr. F. Schmidt, ordl. Professor an der Universität Frankfurt a M. 95 pp. Berlin: Spaeth und Linde, 1927. Price 2 Marks.

The present work, by a distinguished business economist, contains a novel and ingenious contribution towards the theory of the trade cycle.

Starting from the familiar proposition that a business community free from disturbing influences would tend indefinitely to remain in a state of equilibrium because producers' outlay would be continuously equated to consumers' income, the author subjects possible sources of disturbance to minute analysis, with results that may be summarized somewhat as follows:—

Suppose, for example, the community becomes exposed to some adventitious influence such as a bad harvest, a strike, or a change in fashion, a maladjustment of demand and supply will ensue, leading to price changes, whose reactions will evoke fresh price changes, and so on, until the tension becomes insupportable and relief is sought in a counter-movement which projects prices in the opposite direction. The reason for this, according to Dr. Schmidt, lies entirely or at least mainly in the fact that industrial accounting is based upon the figment of the stability of the currency, and that if accountancy makes a shifting monetary unit the corner-stone of its calculations, an error is produced of which the consequences are cumulative. In spite of the experiences of the inflation period it has taken a long time before business men, officials and the general public have come to realize the fallacy of this assumption. It is emphasized that changes in monetary values can have no effect whatsoever on the real values of business assets, and that, if on a rising market the entrepreneur regards his overplus as profit, he is guilty of turning capital into income; whilst the converse is true in the case of a falling market. The simple device of carrying fluctuations in the values of fixed assets to a special subdivision of his capital account is not known to the business man.

On a rising market pseudo-profits are earned because actual costs of production (including provision for wear and tear, depreciation, etc.) get devaluated in terms of current prices, whilst on a falling market, pseudo-losses occur for the contrary reason, the analysis being complicated in the latter case by the fact that unrealized losses have to be taken into account as well as realized losses. Another class of pseudo-profit is alluded to as representing genuine income to the individual, viz. the profit arising from speculation when interest on borrowed money lags behind the rise in prices, etc. Similarly, individual losses arise from speculation when interest overtakes the rise in prices.

When, following a rise in prices, all businesses are making pseudo-profits, it is argued that business men over-estimate their true gains and reckon the return on their capital as greater than it actually is: on this basis they will seek to expand their activities, but their markets will get glutted with superfluous output and they will only be able to employ their capital at a loss. Were pseudo-profits correctly recognised as such, expansion would not take place beyond the limits indicated by true profits, pressure upon the money and capital markets would be relieved, and available capital would remain normally employed without resort to expensive overtime. Moreover, demands upon the labour market would be steadied, and since the upward swing due to the distribution of pseudo-profits as spendable income would not have occurred, no collapse would follow. On a falling market, business men would not be misled by pseudo-losses to the undue curtailment of enterprise, with its accompaniments of over-liquidity and unemployment. Rather would industry realize its ideal of steady and harmonious progress, and with the elimination of all avoidable sources of friction,

the needs of the community would be satisfied with far greater effectiveness than hitherto. True, movements in individual industries would still take place, as well as more general movements due to technical improvements, but in cases where these or other disturbances occurred, they would, as regards their effects upon prices and volume of production, not involve consequences upon a scale greater than that warranted by their own powers.

It is realized that in practice an approximation is made to this programme through the medium of the popular policy of secret reserves. These, in fact, constitute a sequestration of pseudo-profits during years of prosperity for release in times of adversity, and although their primary object is to stabilize earnings and dividends, they incidentally act as a corrective of pseudo-profits and losses, in a way, however, which does not disclose their real significance and which may be misleading if true profits are unknown.

There seems to be a general agreement among German writers that costings should be based upon expenses of reproduction. As regards the financial books, the majority appear to be in favour of adjustments based upon the movements of the general price index and not upon the price movements of any particular industry. Dr. Schmidt criticizes this proposal upon the ground that while it would exhibit correct results in the aggregate, it would not do so for individual businesses.

While Dr. Schmidt's programme represents a step in the right direction, his claim that his system of carrying differences due to price changes to capital account instead of to profit and loss account will infallibly eliminate all pseudo-profits and losses and preserve the physical capital of the concern intact, cannot be sustained. The drawback incidental to this and all similar schemes is, that the ascertainment of business profits depends upon hypotheses that are only true when business both in general and in particular is in a state of approximate equilibrium, and that when this condition fails, the problem becomes indeterminate. It is not clear, for instance, what would happen if a business were carrying temporarily a stock of goods in excess of normal requirements and a fall in prices occurred affecting that particular class of goods alone; nor is it clear what should be done with regard to purchases made on exceptionally favourable terms, *e.g.* of bankrupt stock. In the first case the system would fail to register a loss although the physical capital of the business had been depleted, whilst in the second case it would fail to register a true profit due to *bona fide* business enterprise.

Passing over the difficulties incidental to the frequent revaluation of fixed assets, it may be queried whether such a procedure might not have an unsettling effect upon the business world as the financial year drew to its close, and whether the stereotyping of price changes, as and when they occurred, would not tend to accentuate cyclical disturbances instead of smoothing them out.

It is interesting to compare the author's conclusions with those,

for example, of Mr. Hastings, who holds that the amount of profit distributed by limited companies is invariably too low.

The elaborate book-keeping proposed by Dr. Schmidt appears to be superfluous, for, once admitted that profits are necessarily indeterminate, effective results could be obtained by means of approximate calculations aiming at impounding or releasing just so much money as would be necessary to keep the earning power (and not necessarily the physical capital) of the business unimpaired.

Admitted that this book is extraordinarily interesting and suggestive, and that it represents a substantial contribution towards the study of profits, it is hardly credible, considering the manifold factors involved, that the trade cycle has such a simple explanation as its author suggests, or that business men are misled by appearances to the extent he imagines.

L. R. C.

8.—*Advertising Fluctuations: Seasonal and Cyclical*. By William Leonard Crum, Assistant Professor of Statistics in Harvard College, and Director of the Statistical Laboratory of the Harvard University Committee on Economic Research. 308 + xxvii pp. Chicago and New York: A. W. Shaw Co., 1927. Price \$6.00.

Professor Crum's analytical study of the variations of advertising effort is of interest to those concerned with commerce and journalism, as well as to those who apply statistical methods to any fluctuations in time. Admitting that no perfect measure of advertising effort is yet available, he seeks to show that in the United States advertising reflects economic conditions, and is related to the rate of activity and to the volume of merchandising operations. His attempt to correlate the estimated volume of advertising with the business cycle reported by the Harvard Economic Service is not entirely convincing. One feels that the highly selected data are inadequate samples; that the adjustments are adapted to the end in view, and that painstaking enthusiasm leads Professor Crum to overlook some of the difficulties of dealing with submerged information; whether the fluctuations are ultimately attributable to variability of harvests, to the extension and contraction of credit, or to the alternating optimism and pessimism of a merchandising community. He charts a fairly close correlation for eight years (1919-26) between "total newspaper advertising lineage in the United States with bank debits outside New York," but his total is based on the total of his samples, the series have been corrected for seasonal variation, and one may infer that inclusion of the New York bank debits might have modified the result. Moreover, cyclical fluctuations in volume of advertising which may be attributed to either general or local conditions cannot at present be analyzed, and often the observable secular trend (or its absence) cannot be assigned even to local influences. Professor Crum establishes the general proposition that advertising activity (especially in the miscellaneous or "want" classification) precedes general business activity. He finds that the lineage of advertising in the monthly magazines reflects the major changes which take

place in the general level of business. This may be a chance correlation, because his magazine data are not homogeneous. Indeed, Professor Crum admits that "no clear case exists for the use of any particular series of advertising data as an index for advertising effort."

The statistics for the volume of advertising are derived from the Harvard University Committee on Economic Research (which are above suspicion) and from files of *Printers' Ink* (New York); the *Editor* and *Publisher* (New York), and the statistical department of the *New York Evening Post*. It is the custom of American publishers to boast about the volume of their advertising, and the figures therefore, even with the imprimatur of the meticulous *Printers' Ink*, are challengeable propaganda. The newspaper samples used are typical only in a broad sense; the series is not homogeneous over the term of years; continuity is broken by amalgamations; and the attempt at a sevenfold regional grouping for comparison leaves large areas of the States unrepresented. Professor Crum is fully conscious of these defects, and makes allowances for the imperfections of the record.

To connect the magazine with the newspaper advertising, the newspaper statistics are transformed to fit a conventionalized month of twenty-six week-days and four Sundays, a pragmatic period not enumerated by Sir Napier Shaw in his comprehensive study of statistical time units (*Journal R.S.S.*, July 1925, p. 492). This adjustment is necessitated by the use of data for six- and seven-day publications, the occurrence of five Sundays in a month, and the local incidence of public holidays. An adjustment has also to be made when monthly magazines are not all timed for the beginning of the month. The technique of these adjustments is adequately explained in the last three chapters. An ingenious method, which may be described as interpolation, is used to link up two separate series of statistics, where three overlapping years are approximated by a selective manipulation, and a new curve carried forward for interpretation.

In every publication or group of publications, a seasonal variation is detectable, and its effects are smoothed out by using the median link method of Professor W. M. Persons. The original discussion of this method appears in the *Review of Economic Statistics* (Vol. I. p. 12), and is elaborated in Crum and Patten's *Economic Statistics* (1925). Persons obtains a "link-relative" or the ratio of the item for a particular month (or other interval) to the item for the month preceding. From these ratios a multiple-frequency table is derived, which reveals the average value of the "link-relative" month for month, regardless of chronological order. The arithmetical mean of the three midmost "link-relatives" is regarded as the median, and is an approximation to the typical movement from one month to that immediately following. From these a seasonal index for each month is computed, and is applied to the crude statistics, nine steps being needed to arrive at the ultimate correction. By this means the seasonal peaks and valleys, markedly occurring in all the

advertising (except on the Pacific coast), are conventionalized for comparison with the curve of the business cycle. Gaps in the record are supplied by estimating, and it is not surprising that an occasional good fit is found.

The Persons method does not appear to offer any special advantages over a less tedious method of continuous cumulative averages plotted logarithmically. Professor Crum's computations can, however, be followed by the non-technical reader and require no mathematics beyond the appreciation of the fact that a ratio is not a quantity, and that the ratio or logarithmic scales occasionally used without explanation in Professor Crum's charts are not directly comparable with the ordinary quadrilinear matrix. Superimposed vertically-displaced scales are used to simplify comparisons, but Professor Crum has not hit on the device of horizontal displacement, which would be useful for analyzing the influence of Easter. Some of Professor Crum's inductions are that when peaks and valleys (or maxima and minima) rise in associated series it is evidence of a secular trend or growth factor in volume of advertising; that a series of local recessions is related to the general business cycle; that the volume of national advertising is more sensitive to general changes than is local advertising, particularly in periods of growth.

Dealing with specific classifications of advertising, it seems that in the United States motor-car advertising has reached a saturation point, or, alternatively, that excessive production needs to be accompanied by excessive advertising. He detects a seasonal influence ascribable to the offer of secondhand cars in competition with new models, and also a seasonal influence in estate advertising which has its peaks a month in advance of the general series. Building material advertising is correlated with the official approval of building plans.

The final conclusion reached is that a growth factor in advertising is not clearly revealed from lineage data, and that fuller studies, now proceeding, are needed to take into account the circulation of media and the costs of advertising.

D. W. W.

9.—*The Stabilisation of the Mark.* By Dr. Hjalmar Schacht. 247 pp. London: Allen & Unwin, 1927. Price 8s. 6d. net.

Dr. Schacht's deservedly high reputation will attract many readers to this very interesting book. It is, as he says, "a narrative of personal experiences and an expression of personal views," but it is all the better for that. Dr. Schacht's personal experiences have been at the very centre of German financial affairs.

The first two chapters, bringing the story down to the invasion of the Ruhr, are in the nature of a preliminary. Few will be found to quarrel with Dr. Schacht's summing-up: "From first to last it was the perpetual compulsion to make foreign payments which was the origin of the mark's collapse. If the reparation screw had only been left for a while in peace, Germany could undoubtedly have arrested the mark in its downward course."

The first step towards stabilisation was the issue in August, 1923, of a "stable currency loan" by the Reich, that is to say, of bonds denominated in dollars. "With the issue of this loan the Reich may be said officially to have abandoned the paper mark; and the need was now clamant for a reform of the currency" (p. 77).

Dr. Schacht describes the origin of the Rentenbank. It was Helfferich who devised the plan of raising the capital for a new Bank of Issue by means of a forced loan from agriculture and industry, and of making the notes issued convertible on demand into interest-bearing bonds. But his scheme contained the novel (and probably impracticable) feature of a unit of value expressed in terms of rye. "From the standpoint of monetary theory the rye mark was an utter impossibility," says Dr. Schacht (p. 83). It was Dr. Schacht himself who insisted that what was wanted was a gold unit, and it was with this vital alteration that the scheme took concrete shape in the Rentenbank.

In what sense was the rentenmark a *gold* unit? It was not convertible into gold, but into bonds of the Rentenbank (Rentenbriefe). It is a curious omission on Dr. Schacht's part that he says nothing about the currency in which these bonds were themselves denominated. Had they been denominated (as was at one time proposed) in rentenmarks, the relation of the unit to gold would have been wholly fictitious. The rentenmark notes would ultimately have been convertible into nothing but themselves, like the notes of Law's Mississippi Company.

Convertibility into amply secured interest-bearing gold obligations supplied a firm foundation for the whole plan. When Dr. Schacht says (p. 86) that "the theoretical basis of the rentenmark must be regarded as altogether inadequate," he is hardly doing justice to the scheme. Experience had *already* shown that a substantial measure of confidence might be accorded to an interest-bearing bond denominated in gold.

The rentenmark was a success. But the stability gained was frightfully precarious. It was on Dr. Schacht that devolved the responsibility for piloting through the initial dangers. In the early months of 1924 the mark was perceptibly below par, and the Reichsbank was unable to meet more than a small proportion of the demands upon it for foreign exchange. At the same time it was quite impossible to gain control of credit by means of a deterrent bank rate.

In face of distrust of the currency no rate that could have been contemplated would really have checked speculators with a recent recollection of rates of 5, 10 or 20 per cent. *a day*. The way to safety was found through a *rationing* of credit. The total of the loans and discounts outstanding in the Reichsbank (which carried on the business of lending to traders on behalf of the Rentenbank) was rigorously limited to the amount (two milliards) recorded on the 7th April. After three months of that régime inflationary speculation was eradicated, and by June the Reichsbank was meeting demands for foreign exchange in full.

For this drastic and courageous action all the credit is due to Dr. Schacht. The story is told in his book simply and adequately and without egoism. He fully recognizes the exceptional character of the measures taken. "I never concealed from myself that credit rationing was an extremely imperfect and undesirable form of action for a bank of issue, and I trust that it may never be necessary to have recourse to it again. But extraordinary situations call for extraordinary remedies, and cannot always be mastered by the theoretical rules evolved for normal conditions" (p. 203).

One of the most interesting chapters of the book is that entitled "The Dawes Plan." It is devoted chiefly not to the Dawes Plan in general, but to the portion of the Plan relating to the reconstitution of the Reichsbank. Dr. Schacht here displays a certain antagonism to the prevalent doctrinaire views as to the advantages of an "independent" Central Bank. He fought (and with a considerable measure of success) to maintain the Reichsbank's "character as a central department of the Reich." The appointment of the President of the Reichsbank was made subject to the approval of the President of the Reich.

Provision was made for the Reichsbank to discount bills with only two signatures (i.e. without the endorsement of another bank). "The Reichsbank," he holds, "must be in a position, in given circumstances, to compete directly with the private banks."

Dr. Schacht and Sir Robert Kindersley were the two members composing the Organization Committee set up to apply the proposals of the Dawes Plan to the Reichsbank. One of the matters to be dealt with was the reserve to be held against the note issue. The Dawes Committee recommended a one-third reserve of gold and foreign exchange, and were prepared to allow the *whole* to be in the form of exchange. The Organization Committee revised this proposal and required a 40 per cent. reserve, of which three quarters must be gold. Consequently the Reichsbank is now required to hold 30 per cent. of its note issue in gold.

In referring to criticisms of the accumulation of gold which followed in 1924-6, Dr. Schacht remarks that he does not "set great store by currency theories" (p. 208). "I merely note that the theory of metallic currency is now stronger, and not weaker, than ever it was, and that nothing showed the superiority of gold so much as the war." A critic might perhaps be led to say that if Dr. Schacht's practical judgment is sometimes found to be at fault, it is just because he *does* set great store by currency theories, and sometimes by currency theories which appear to be "stronger and not weaker," that is to say, to be in fashion at the moment.

But it is interesting to find his homage to the "theory of metallic currency" qualified by the significant sentence: "To say so much is not to say that the heads of the great central banks of issue cannot and should not endeavour even more than before to avoid fluctuations in the price level by wise distribution and employment of the gold on which the currencies are based."

R. G. H.

10.—*Die säkulare Entwicklung der Kaufkraft des Geldes.* Von Dr. Emil Notz. viii + 283 pp. Jena: Gustav Fischer, 1925. Price 1.4 Marks.

This work (the contents of which are less compendious than might be inferred from the title) embodies the results of Dr. Notz's investigations into retail food prices in Bâle during the two periods 1800–1833 and 1892–1923. Previous methods of measuring the purchasing power of money are set aside in favour of the method of Andreas Walther, who takes as his point of departure the purchasing power of the income of a middle-class family of defined status. The most interesting feature of the book is a series of six logarithmic diagrams showing the prices of the chief articles of food in Bâle during the periods mentioned, the cost of feeding a "normal" family, and, for purposes of comparison, the wages of a postman. Real wages are represented by the logarithmic differences between the cost of feeding the "normal" family and nominal wages.

Another diagram of general interest shows the percentage allocation of expenditure in family budgets collected for Bâle, Saxony, New York, the United States and China. In addition there is a considerable amount of detailed information as to prices in Bale, together with occasional comparisons with figures from other countries.

Data are in the main drawn from official sources, and the author has taken considerable pains to sift and collate the large mass of information available.

Whilst wishing to pay a tribute to Dr. Notz's immense industry, we are afraid the fruits of it are too indigestible for the average English reader.

L. R. C.

11.—*A Primer of Agricultural Economics.* By Sir Henry Rew, K.C.B. 229 pp. London: Murray, 1927. Price 5s. net.

Sir Henry Rew has added to the long list of his services in making the economics of agriculture familiar to the urban reader by the publication of *A Primer of Agricultural Economics*. The work is designed to serve as an introductory manual for those who desire to study the subject, and as such it will be widely appreciated. The subject is approached from the historical side and is illustrated by materials, statistical and otherwise, drawn from the historical development and present organization of agriculture not only in this country but in other countries. Sir Henry has arranged the matter under three main headings: "Factors of Production," "Costs of Production," and "Disposal of Produce," and he has arranged an eminently lucid and readable exposition of this subject within the limits which he has laid down for himself. It will be observed that he has not dealt under a separate heading with the questions falling under the fourth heading in the ordinary economic text-book, viz. distribution. Till recently the amount of reliable material under this heading was scanty, and although Sir Henry has dealt incidentally with certain aspects of distribution under the headings he has chosen, the opinion may be ventured that had the wealth of material

rendered available in the Ministry of Agriculture Report on the Agricultural Output of England and Wales, 1925, been published in time to be used by him he would have arranged the book somewhat differently. In his effort, successful as it has been, to cover a very wide ground within this small volume, a few errors were almost inevitable, and these, no doubt, will receive his attention as a future occasion presents itself. For example, in his first chapter he deals with the distribution of agricultural holdings in England and Wales, and we very much fear that the reader will fail to realize that these "holdings" are purely rating units and not necessarily economic farming units; again, the publication side by side of index-numbers of the cost of living, prices of agricultural produce, and the minimum weekly wage of agricultural workers is inaccurate if it is intended, as most readers, it is feared, will understand it, to represent a comparison of variations in the ability of employers to pay wages with variations in the wages actually paid. The proper comparison with the index-numbers of the prices of agricultural produce is not the minimum weekly wage, but the weekly wage-bill of the employer, which, owing to variations in the hours worked at ordinary time rates from time to time over the period, is quite another thing. And, finally, without the slightest desire to depreciate the work now being done by agricultural research workers, it may be questioned whether there is that continual flow of new knowledge from the laboratories to the farmers that Sir Henry suggests. The production of such knowledge is necessarily a slow process, and it is at least significant that although the representative organization of working farmers invited the Government over two years ago to utilise the organization's machinery for the prompt dissemination of the results of the work of research centres, the invitation has not hitherto been accepted.

These, and one or two other points, will, as has been said, without doubt receive Sir Henry's attention when the "Primer" reaches the second edition which its general merit thoroughly deserves.

J. B. G.

12.—*The American Wool Manufacture.* By Arthur Harrison Cole, Ph.D. 2 vols. 392 and 328 pp. Harvard University Press, Cambridge, Mass., and Oxford University Press, London, 1927. Price 31s. 6d.

Detailed studies of particular industries are the necessary foundation for economic history, and future historians of America's industrial development will be grateful to Mr. Cole for these two weighty tomes. He has hunted out all the material he could lay his hands on, reports of societies, files of local newspapers, records of long-established firms, as well as more easily accessible sources of information, and out of all this he has produced the detailed history of an important industry. For the wool industry is always an important industry for the woollen-clad folks of the temperate zones; and it is also bound to be a particularly interesting one, for it is unusually susceptible to the vagaries of fickle Dame Fortune. This arises in

part out of its intimate and varied connections with other industries and occupations, with sheep-farming and the lamb and mutton trade, with the engineering and transport industries, with its colleagues and competitors, the other textile trades, and in part out of its close association with two rather unaccountable and distinctly high-handed sets of persons, the makers of fashions and the makers of tariffs. Hence the history of the woollen industry is full of unexpected twists and turns and can easily provide material for 700 pages of substantial size. But one cannot expect a passion for research always to be accompanied by a gift of literary style or a knack of easy writing. The general reader must therefore be warned that these volumes are mines of solid information rather than rockets of light literature.

To an English student perhaps the most interesting aspect of the American woollen industry is the contrast it presents to our own old staple trade. This contrast is, of course, only to be expected when one considers how different have been the conditions in the two countries during the last one and a half centuries, the period with which Professor Cole deals. The American manufacturers are beset with difficulties altogether different from those experienced in the West Riding of Yorkshire and in the West of England woollen district. For example, it had long to face competition both ways, so to speak; on one side from the family of the country farmer and backwoods pioneer, who continued for many years to have his own wool spun and woven into cloth after his own style, to suit his own particular needs; and on the other side from the English manufacturers, who had long practice in tickling the fancy of the fashionable young men and women in the New England seaport towns. Again, supplies of raw wool were inadequate and uncertain, for the home-grown wool was of poor quality and short in quantity, and imports from abroad were at the mercy of tariffs and the foreign markets. Then, again, customers lived far away from the factories, from the distributing centres and from each other, and means of transport were primitive. The distributing agencies were undeveloped and by no means "rationalized" in the up-to-date sense of the word; in consequence economic crises were frequent.

Nevertheless Mr. Cole's picture is one of steady progress, both in the amount of woollen goods produced and in the quality and variety of cloth achieved; and the course of events shows this progress to be due, hardly if at all to the changes and chances of fashions and tariffs, but, as every sound economist knows, to bold planning, careful organizing and, most of all, to hard work.

D. M. B.

13.—*The Iron Industry in Prosperity and Depression.* By Homer Bews Vanderblue and William Leonard Crum. 1:3 pp. London, New York and Chicago: A. W. Shaw & Co., Ltd., 1927. Price \$7.50.

This book deals with the American iron and steel industry. It falls into three parts. The first part discusses prices and the pro-

duction of iron and steel; the second part, which fills the bulk of the book, examines the regional production of pig iron; the last part evaluates methods of forecasting conditions in the iron and steel industry. To the specialist in the American iron and steel trade, the second part is possibly more informative than the rest of the book; to the general observer, particularly to the British observer, this section is interesting chiefly because of the light it throws on the shift which has taken place in the last twenty-five years in the geographical distribution of productive plant. Plainly, therefore, the shift of Britain's industrial equilibrium from North to South is not unknown—*mutatis mutandis*—elsewhere in the modern world.

The other two parts of the book analyze the data which are familiar to all students of the American iron and steel industry—output of iron and steel, iron and steel prices, the price of scrap, unfilled orders and net earnings of the United States Steel Corporation and fluctuations in the output of coke—by the methods used by the Harvard Economic Service. After elimination of seasonal fluctuations and secular trend, the cyclical variations to which the production of iron and steel is subject are set forth both in tables and graphs, and the relations in time of iron and steel prices and output are discussed. No novel results are yielded by this analysis. Forecasting in the iron and steel trade, the authors conclude, is not possible by the mechanical correlation either of prices with output or of any other "barometer" with output. In particular, it is doubtful whether it is possible "to develop a sensitive indicator of demand which will anticipate, in its movements, the variations recorded in the orders of the steel industry itself," and therefore "the forecasting problem in the iron and steel industry is reduced to the use and interpretation of certain series arising within the industry itself." Hence it is necessary to study the state of the industry *ad hoc*, and to steer its course not merely by the compass, nor yet by the quadrant, but also by dead reckoning, the sun, stars, wind, currents, and tidal drift of trade, and sometimes by sheer navigator's instinct. All of which is obviously true. This book may be commended as a purge to all those who believe in automatic forecasting, and as solid meat to students desirous of learning the limitations of their science.

J. M.

14.—*Machinery and Labour*. By George E. Barnett. 161 pp. London: Humphrey Milford; Cambridge, U.S.A.: Harvard University Press, 1926. Price \$2.00.

Professor Barnett's book deals with the effects produced upon labour by the introduction of machinery. This topic has a long and controversial history. Some of the authors who have discussed it maintain a Panglossian optimism; others take cold comfort in a Marxian pessimism. As behoves a Professor of Statistics in the Johns Hopkins University, Professor Barnett neither soars to cloud-cuckoo-land nor rushes down the Gadarene steep. His book is confined to a factual description and analysis of the effects of the introduction of the linotype machine, the stone-planer, the semi-automatic

bottle-making machine and the automatic bottle-making machine—which occupies four chapters of his book—and an inductive discussion of the general conditions in which labour is likely to be most considerably displaced by machinery, followed by an examination of trade union policy towards the problem—which fills the remaining portion.

The facts which Professor Barnett has brought together illuminate the history of these little-known trades, but cannot be said conclusively to resolve the problem posed by the introduction of machinery in places where it was formerly unknown. This problem is analogous to the difficulties confronted by those British trades which find a domestic industry supplying to-day the markets to which they formerly exported. Professor Barnett's broad conclusion, that "the leading element in determining the displacement of skill is the amount of the disturbance, measured chiefly by the labour-displacing power of the machine and the rapidity with which it invades the trade," is capable of adaptation to the wider problem of markets lost through the development of new industries. His conclusion—or, rather, one of his conclusions—as to the proper trade union policy in such trades is also relevant. It may be summed up in two words: Be practical. Professor Barnett's ultimate return to common sense in some measure compensates for the arid style and severely academic atmosphere of his book.

J. M.

15.—Other New Publications.*

Bhatnagar (B. G.), M.A. The Co-operative Organisation in British India. v + 321 + xiv pp. Allahabad: Ram Narain Lal, 1927.

[A short account of the growth of the co-operative movement in India during the past twenty years. It sketches the earlier history of the movement, and gives a description of its present organisation. Certain defects in present methods which act as hindrances to further development are noticed, and suggestions for improvement are given. There is an index.]

La Cassa di risparmio di Torino nel suo primo centenario. 629 pp. 4to. Torino: Tip. Eredi Botta, 1927.

[The centenary of the foundation of the Turin Savings Bank has been commemorated by the publication of this volume, which consists of two memoirs, the first by Professor G. Prato, on the origin and development of provident institutions in Piedmont, the second by Professor G. Fenoglio, on the history of the Cassa di Risparmio and its predecessor, the Cassa de' Censi e Prestiti, which was instituted in 1795. Dr. Alberto Geisser, President of the bank, contributes a preface, and there is an appendix of statistical tables and documents.]

* See also "Additions to the Library," p. 132, *et seq.*

Festgabe für Alfred Manes aus Anlass seiner 25 Jährigen Tätigkeit als Vorstand des deutschen Vereins für Versicherungs-Wissenschaft. xi + 337 pp. Berlin: E. S. Mittler und Sohn, 1927. Price 40 marks.

[This volume has been issued to commemorate the services of Mr. Manes to the science of insurance during the 25 years of his Directorship of the German Actuarial Society, and consists of some twenty memoirs dealing with different phases of insurance by men eminent in the insurance world. The book is a valuable record of the scientific, legal, and mathematical aspects of insurance.]

Foster (W. T.) and Catchings (W.). Business without a Buyer. xx + 205 pp. Boston and New York: Houghton Mifflin Co., 1927. Price \$2.

[The authors describe this book as an "attempt to give the substance of *Money and Profits*," their earlier works, "in popular form." Elaborate statistical detail is omitted or summarized, the argument being driven home by means of every-day simile, and not without a considerable amount of repetition. Readers of the two former books will recollect that the theme, briefly stated, is that economic depression is the result of a deficiency in the total of consumers' spending power in relation to the selling price of the goods produced, due to the facts that the total received for the product must include a profit and must therefore exceed the sums paid to the potential consumers who produce them, and that the spending power of the latter is again reduced by the necessity of saving. This "dilemma of thrift" is, in fact, the crux of the argument which is developed and recapitulated through ten chapters. The reader hopefully persists, only to learn that the way of escape is to be the subject of a future book. It should be noted that a prize of \$5000 was offered for "the best adverse criticism" of *Money and Profits*, and that the offer evoked 435, from 25 countries, the critics including professors of economics in 40 universities.]

Hawkins (L. Whitem), F.C.A. Cost Accounts. 7th edition. v + 103 pp. London: Gee & Co., 1927. Price 10s. 6d. net.

[Mr. Hawkins' object is to explain the principles relating to the ascertainment of manufacturing costs and to show by examples the correctness of these principles. The book is in two parts, the first dealing with the subject in its broad outlines, and the second consisting of suggestions for securing greater minuteness and accuracy. The set of specimen forms at the end of the book can be opened out and read side by side with the text referring to them. The book is well indexed.]

Indri (Giovanni). Pour la santé des ouvriers. Deux ans d'activité dans le domaine de l'assistance, avec une préface de S. Exc. M. Benito Mussolini, Premier Ministre. 279 pp. Milano, 1927.

[An account, by its President, of the work done by the Cassa Nazionale per le Assicurazione Sociali, during the past two years, for the benefit of Italian workmen, by the provision of sanatoria and convalescent homes for its members. The main object of the Fund is the provision of pensions for old age and invalidity, but it wisely sets out also to reduce the causes of invalidity, and its efforts in this direction have had successful results. Detailed accounts of the several establishments and the methods of treatment are given. There are numerous statistical tables showing the occupations and diseases of the patients treated, and numerous illustrations are included.]

Kerr (R. B.). Is Britain over-populated? 118 pp. Published by the Author, 97, North Sydenham Road, Croydon, 1927. Price 1s. net.

[The interrogative form of the title is rhetorical. The book embodies the author's unhesitating affirmative, and shows his grounds for concluding that over-population is the root, if not the sole cause, of all economic ills, that reduction of population is the only hope of this country, and birth-control the means whereby it is to be accomplished and permanent prosperity inaugurated. In the course of his argument, which is very clearly and concisely set out, the author has brought together a number of authoritative figures, mainly official, relating to populations, birth-rates, real wages, agricultural production, numbers of passenger motor cars (used as an index to prosperity), national income, etc., and has amplified them by quotations from such authorities as Sir Josiah Stamp, Professor Bowley, Sir Henry Rew, Sir Thomas Middleton, and Sir John Russell, so that the book, although a piece of special pleading, is incidentally a small compendium of serviceable data relating to the problems under consideration.]

Roumian (Adib). Essai historique et technique sur la Dette Publique Ottomane. 332 pp. Paris: Marcel Giard, 1927. Price 40 frs.

[M. Roumain's book is a systematic study of the Ottoman Public debt from its beginning in 1854 to the period immediately before the war. Some space is devoted to an analysis of the working of the Decree of Muharram and of the revenues ceded under the Decree to the bond holders. The final chapters describe the post-war partition of the Debt among the various succession states under the Treaty of Lausanne. There is a bibliography but no index.]

Stephenson (J.), M.A. A Statistical Atlas of the World. vii + 137 pp. fol. London: Pitman, 1927. Price 7s. 6d. net.

[An atlas of physical and economic geography, with numerous statistical tables. It is in two sections, the first general, the second regional. The general section deals with the physical geography, ethnology and natural products of the world; the second section with the several continents, their physical features, means of communication, and other phases of commercial development. Lists of the chief towns with their populations are also given. The maps are printed in one colour only, but skilful shading enables the various features to be adequately distinguished.]

Tupling (G. H.), M.A. The Economic History of Rossendale. xxiv + 274 pp. Manchester University Press, and London: Longmans, 1927. Price 2s. net.

[An interesting study of the economic and social conditions of this particular Lancashire locality before and during the Industrial Revolution, and of the influence of that movement on its later development. The history opens with an account of medieval conditions, and continues with the enclosures of the 16th and 17th centuries, the regulation of common lands and their sub-division, the development of the woollen industry of the 17th and 18th centuries, its methods and organisation. The author points out the part played by the sub-division of holdings in fostering domestic manufactures, and shows how, later, the manufacture of cotton gradually displaced the woollen industry. The social effects of the introduction of machinery appear to have been less severe than in other parts of Lancashire. The small holders benefited by the rapid increase of population and the improved means of communication. The appendices include several tables, there are maps and plans, a bibliography and an index.]

Weeks (Courtenay C.), M.R.C.S., L.R.C.P. *Alcohol in Medical Practice*: with a chapter on the Evolution of Medical Opinion. 186 pp. London: H. K. Lewis, 1925. Price 3s. 6d.

[The author's aim is to demonstrate by means of facts and figures that the use of alcohol in medical practice is steadily diminishing and that its abandonment is justified by the results. His figures are mainly derived from returns supplied by Hospitals, Asylums, Sanatoria and Convalescent Homes in the British Empire, and a considerable part of his evidence is taken from standard medical text books, the publications of the Medical Research Council, and the writings of eminent physicians. The general results of the enquiry show that while "a large number of physicians and surgeons consider that there is a definite place for alcohol in the treatment of disease," there has been a distinct "reduction of the use of wines and spirits" in the treatment of institutional patients and in medical and surgical practice in all parts of the Empire. The figures of the institutional returns are given in an appendix, and are generally reviewed in Chapter 2; the particular effects of alcohol in different categories of disease, upon children, and in surgical conditions, are dealt with in special chapters. The author considers that the persistence of public belief in the efficacy of alcohol is largely due to the use of the word "stimulant" in this connection.]

Williamson (J. W.), B.Sc. *In a Persian Oil Field. A study in scientific and industrial development.* 189 pp. London: Ernest Benn, 1927. Price 7s. 6d.

[Mr. Williamson's book is a description of the regions developed by the Anglo-Persian Oil Co., which he visited in 1926. It is an interesting record of the successful application of scientific knowledge and method to an industry. The first part of the book deals with the scientific aspects of oil production, the methods of finding the oil, drilling, the construction of the pipe line, the provision of water, fuel, light and power, and the refining of the crude oil. The second part deals with the human and sociological factors involved in a great industrial undertaking, and describes the provision made for the health, comfort, housing, and training of those in the employ of the company. The book is very readable and has numerous illustrations. Lord Balfour contributes a preface letter.]

Wolff (Henry W.). *Co-operation in India.* 2nd edition. ix + 298 pp. London: W. Thacker & Co., 1927. Price 13s. 6d.

[A study of the co-operative movement in India, which, in the author's opinion, is proving a powerful means for ameliorating the conditions of the people both in the country and the towns. Mr. Wolff traces the movement through its various steps and draws attention to the distinctive features incidental to Indian conditions. The various forms of co-operative credit, mortgage credit, non-agricultural credit, and grain banks are described, and the course of future developments is forecast. A postscript to the book gives the latest co-operative statistics obtained by favour of the Indian Government, and these show a further increase in all branches of co-operation. Ignorance and illiteracy are, in the author's view, the main hindrances to the growth of the movement, and more voluntary help is required to overcome them.]

CURRENT NOTES.

The totals of United Kingdom foreign trade during 1927 show, when compared with the figures of 1926, a reduction in imports and an increase in exports. This result was to be expected, since the imports of 1926 were swollen by the necessity of providing coal from abroad while our own mines were at a standstill, and, though deliveries continued into the early months of 1927, they affected the totals for that year to a much smaller extent than was the case in 1926 : exports, on the other hand, held up as a consequence of the industrial disturbances of 1926, were naturally greater in 1927. When comparison is made with the figures of 1925, in view of the difficulty of interpreting the relations between the figures of 1926 and 1927 apart from the point already noted, the fact that considerable changes in prices have occurred between 1925 and 1927 is of importance. As shown in the Summary below, 1925 totals were well in excess of those of 1927 both for imports and exports, but in each case price changes of greater extent than would account for the deficiencies in 1927 have taken place. The trade of 1927 was thus somewhat greater in volume than that of 1925, and, so far as the export trade in British goods is concerned, the last quarter of the year gave the greatest expansion. The figures showing the details usually given in these Notes are as follow :—

| Movements and Classes. | 1927. | 1925. | Excess (+) or Deficiency (—) in 1927. |
|---|------------------|------------------|---------------------------------------|
| Imports, c.i.f.— | £'000 | £'000. | £'000. |
| Food, drink and tobacco | 339,339 | 570,101 | — 30,762 |
| Raw materials and articles mainly un-manufactured | 351,962 | 424,783 | — 72,821 |
| Articles wholly or mainly manufactured ... | 322,407 | 319,631 | + 2,776 |
| Other articles ... | 5,679 | 6,200 | — 521 |
| Total Imports ... | 1,219,387 | 1,320,715 | — 101,328 |

| Movements and Classes. | 1927. | 1925. | Excess (+) or Deficiency (—) in 1927. | | | |
|---|--------------------|---------------------|---------------------------------------|---------------------|--------------------|---------------------|
| Exports, f.o.b — | £'000. | £'000. | £'000. | | | |
| <i>United Kingdom Produce and Manufactures—</i> | | | | | | |
| Food, drink and tobacco | 52,280 | 54,987 | — 2,707 | | | |
| Raw materials and articles mainly un-manufactured | 76,356 | 84,351 | — 7,995 | | | |
| Articles wholly or mainly manufactured ... | 563,964 | 616,608 | — 52,644 | | | |
| Other articles ... | 16,505 | 17,435 | — 930 | | | |
| <i>Imported Merchandise—</i> | | | | | | |
| Food, drink and tobacco | 26,523 | 32,134 | — 5,611 | | | |
| Raw materials and articles mainly un-manufactured | 71,246 | 90,336 | — 19,090 | | | |
| Articles wholly or mainly manufactured ... | 25,134 | 31,458 | — 6,324 | | | |
| Other articles ... | 160 | 109 | + 51 | | | |
| Total Exports ... | 832,168 | 927,418 | — 95,250 | | | |
| Bullion and Specie— | | | | | | |
| Imports ... | 39,628 | 52,073 | — 12,445 | | | |
| Exports ... | 35,329 | 61,836 | — 26,507 | | | |
| Movement of Shipping— | Number of Vessels. | Thou- and Net Tons. | Number of Vessels. | Thou- and Net Tons. | Number of Vessels. | Thou- and Net Tons. |
| <i>Entered with cargoes—</i> | | | | | | |
| British ... | 33,472 | 40,421 | 31,968 | 37,974 | + 1,504 | + 2,447 |
| Foreign ... | 26,874 | 20,168 | 22,404 | 17,538 | + 4,470 | + 2,630 |
| Total ... | 60,346 | 60,589 | 54,372 | 55,512 | + 5,974 | + 5,077 |
| <i>Cleared with cargoes—</i> | | | | | | |
| British ... | 38,179 | 42,363 | 38,583 | 41,407 | — 404 | + 956 |
| Foreign ... | 22,260 | 21,135 | 22,207 | 20,905 | + 53 | + 230 |
| Total ... | 60,439 | 63,498 | 60,790 | 62,312 | — 351 | + 1,186 |

The tonnage cleared outwards with cargo was little different in the aggregate in 1927 from that recorded for 1925, the British vessels accounting for the larger part of the small increase in tonnage, though they were rather fewer in number in the later year. In the entries inwards there was an increase in tonnage of 9 per cent., the proportionate increase in the numbers being less than that in tonnage in the case of British vessels. In 1927 the British tonnage entered with cargoes was almost exactly double that of foreign vessels entered, and the same relation holds for the tonnage cleared with cargoes.

The extent of the variations in the money value of our trade due directly to price changes between 1925 and 1927 is dealt with in the usual manner in the *Board of Trade Journal* for 2nd February. The following table summarizes the results there given.

| Class of Trade. | Trade of 1927. | | Trade of 1925. As declared (prices of 1925). |
|---|----------------------------------|---------------------------------|--|
| | As declared (prices of 1927). | Estimated at prices of 1925. | |
| | Million £. | Million £. | Million £. |
| Total imports | 1,219.4 | 1,395.9 | 1,320.7 |
| Re-exports of imported merchandise | 123.1 | 141.8 | 154.0 |
| Exports of United Kingdom produce and manufactures | 709.1 | 796.5 | 773.4 |

The apparent decrease of imports from £1,321 million in 1925 to £1,219 million in 1927, or by nearly 8 per cent., thus corresponds to an actual increase of volume by nearly 6 per cent., and in the case of exports of goods produced or manufactured in this country the decrease in value from £773 million to £709 million, or by 9 per cent., corresponds to an actual increase of volume by 3 per cent. The extent and rapidity of price changes is still such as to make careful attention to them essential.

The usual estimate of the approximate magnitude of the invisible elements in our trade balance, made by the Board of Trade, has yielded a total for the balance of the invisible current items (shipping earnings, dividends, interest and commissions derived from abroad, etc.) greater by £23 million than that for 1926, and by £39 million than that for 1925. The import excess for merchandise and bullion and specie was £392 million in 1927, a decrease of £83 million from the 1926 total and an increase of £8 million on the 1925 total. To complete the account, a balance of payments over receipts overseas by Government Departments of £11 million in 1925 was followed by a balance of receipts over expenses now estimated at £3 million in 1926, receipts being estimated to balance payments in 1927. The change from a net credit of £54 million in 1925 for the visible and invisible items together to a net deficit of £7 million in 1926 (taking account of revised figures of imports and exports and of Government payments and receipts) was thus substantially less than the increased excess of imports over exports of material goods. Comparing 1927 with 1926 there is an improvement of £103 million in the final net balance, to which the decrease of the recorded excess

of imports over exports has contributed £83 million. Even if the aggregate of the invisible items (other than payments by Government Departments or to them) had not been greater than in 1925, the net balance would have amounted to £57 million, and if the invisible items (with the same exception) had been estimated at the same figure in 1927 as in 1926, the resulting calculated balance would have been £73 million. That 1927 should have given better results than 1926, in respect of the net balance of invisible items, is in accordance with reasonable expectation, and that the net figure of 1925 has been increased appears to throw no doubt on the general reliability of the calculations. That they cannot profess to any great degree of precision is a point constantly emphasized in the articles in which the results are set forth.

During the second half of 1927 there was little change in the level of wholesale prices in this country as measured by the Board of Trade index-number. Average prices for the month of June gave an index of 85.3 (1924 prices = 100). By August this had fallen to 84.8, this reduction being due to a fall in the figure for the food group from 93.8 to 90.9, while there was an increase in the non-food group from 80.9 to 81.7. Then the downward movement of wholesale food prices was reversed by a sharp increase in mutton, lamb, pork and bacon prices which carried the food group figure to 92.2, and this, being accompanied by a further slight increase in the non-food figure, brought the total index-number to 85.5 for the month. October and November saw the downward tendency renewed in both groups this time, so that average prices for November were measured by an index of 84.9. While the food group figure remained unaltered at 91.4 in December, there was a slight recovery in other prices which gave a total index-number of 85.1, or a little under 4 per cent. less than the figure for the closing month of 1926.

In reviewing the course of the index-number during the year 1927 the *Board of Trade Journal* points out that the monthly variations were between the April figure of 84.2 and the January figure of 86.4. Excluding the figures for the first two months of the year, when the index-numbers for metals and minerals other than iron and steel were still affected by the results of the coal stoppage, the index-numbers for the last ten months of 1927 did not vary by more than 1½ per cent. from the yearly average (85.1). If the average of 1913 be substituted as the basic figure in the index, the average for 1927 is represented by 141.4, as compared with 148.1 for 1926 and 159.1 for 1925. On this basis the index for the year for the food group was 152, which covered a range from 137.5 for meat to 165.4 for the

miscellaneous food-stuffs, while that for the non-food group was 135.7, covering a range from 119.9 for iron and steel to 156.4 for textiles other than cotton.

Increases in all the groups making up the total upon which the *Economist* index-number of wholesale prices is based, with the exception of a continuation of the downward movement in the minerals group, carried this index-number during the month of August from 181.9 to 185. Then a downward movement in the total brought the index-number back to 181.6 at the end of October. This movement was continued during November and at a slower rate during December, finally producing at the end of the year a figure 179.3, as compared with 180.7 at the end of 1926. The *Economist* figure, therefore, confirmed the record of the Board of Trade in characterising 1927 as a period of comparative stability in the general level of prices. The fluctuations that did occur were due in the main to the after effects of the great coal stoppage of 1926, but these were narrower than might have been expected, the range between the highest and lowest points being less than a third of the corresponding range in the year 1925. But this comparatively restricted movement in the general price level did not mean that there were not big changes in certain categories of commodities, of which the principal were a substantial rise in textiles, due mainly to cotton, and a sharp fall in the mineral group, for which coal and iron were mainly responsible. At the end of 1927 the increase in the general price level over that of July, 1914, was 53.8 per cent., as against 55 per cent. at the close of 1926. By far the biggest increase (104 per cent.) above the pre-war level was shown by subsidiary food-stuffs, while minerals and miscellaneous were only 33 and 32 per cent. respectively higher than in July, 1914.

The *Statist* index-number agreed with the *Economist* in recording an increase of wholesale prices during August, to which both food-stuffs and industrial materials contributed, but the measure of it (from 122 to 122.8) was much less than that quoted above from the *Economist*. By the end of October the *Statist* index-number had fallen to 120.6. An increase in food-stuff prices during November prevailed over a further reduction in materials prices to produce a slight increase in the general level at the end of that month to 121.5, but in December, of two similar movements in the main groups the downward tendency in mineral prices proved stronger than the hardening of food-stuff prices, and the year ended with the general index-number at 121.4, as against 123.9 at the end of 1926. On the

year-end comparison all the groups, with the exception of textiles and sundries, showed declines. The provisional figure for the average for the year (122·6) was 2·7 per cent. below that for 1925; it was the lowest in any year since 1915, and was 51·2 per cent. below the average for 1920, the year of highest prices. It is interesting to note the *Statist* index-number for the end of 1927 made the rise in prices since before the war less in Great Britain than in the case of any of the gold or gold exchange standard countries according to the latest figures available quoted by that journal; in particular the American figure (*Bradstreet's*) was then 47·3 per cent. above pre-war, against only 42·8 per cent. in the case of the *Statist* index.

The following table summarizes movements in the general level of retail prices in Great Britain and Northern Ireland, as estimated by the Ministry of Labour :—

| | | | | Percentage increase in retail prices since July, 1914. | |
|-------------|-----|-----|-----|--|---|
| | | | | Food only. Per cent. | All items included in the budget. Per cent. |
| August 2 | ... | ... | ... | 56 | 64 |
| September 1 | ... | ... | ... | 57 | 65 |
| October 1 | ... | ... | ... | 61 | 67 |
| November 1 | ... | ... | ... | 63 | 69 |
| December 1 | ... | ... | ... | 63 | 69 |
| December 31 | ... | ... | ... | 62 | 68 |

From August 2 to November 1 the seasonal upward movement of retail food prices, in which increases in the prices of eggs, butter and milk were the most prominent feature, was limited by a fall in the price of potatoes, followed by a reduction in bacon prices. During November these two movements just balanced each other, and during December the turn in the seasonal swing of eggs and butter prices gave a downward direction again to the food index-number, which at the end of the year was 5 points below the corresponding figure of a year before. From the fact that the food items accounted for 60 per cent. of the total family budget in July, 1914, one can deduce that the average level of the prices of other items included in the budget, standing at 76 per cent. above July, 1914, on August 2, reached 78 per cent. by November 1, and had decreased slightly to 77 per cent. by the end of the year. This figure compares with an increase of 87 per cent. on January 1, 1927.

The following table summarizes for the principal countries the latest information as to retail prices overseas as reproduced in the *Labour Gazette*. The third column gives the percentage increase in retail food prices on those ruling in July, 1914, or some similar pre-war period; the fourth column gives the estimated percentage increase for all the items covered by the budget in each case, such items, in addition to food, comprising generally rent, clothing, fuel and light, and other household requirements:—

| Country. | Date of latest return. | Food. | All items. |
|---------------------------------|------------------------|----------------------|----------------------|
| <i>Overseas Dominions, etc.</i> | | Percentage increase. | Percentage increase. |
| Australia | November, 1927... | 57 | 45 (2nd qr.) |
| Canada | November, 1927... | 51 | 56 |
| India (Bombay) ¹ ... | December, 1927 ... | 49 | 51 |
| Irish Free State ... | October, 1927 ... | 72 | 75 |
| New Zealand | November, 1927... | 44 | 61 |
| South Africa | November, 1927... | 19 | 32 |
| <i>Foreign Countries.</i> | | | |
| Belgium | November, 1927... | — | 709 |
| Czechoslovakia (Prague) | November, 1927... | 805 | 629 |
| Denmark | October, 1927 ... | 52 | 76 |
| Egypt (Cairo) | October, 1927 ... | 46 | — |
| France (Paris) | December, 1927 ... | 423 | 407 (3rd qr.) |
| France (other towns) | November, 1927... | 426 | — |
| Germany | December, 1927 ... | 53 | 51 |
| Holland (Amsterdam) | September, 1927... | — | 67 |
| Italy (Milan) | December, 1927 ... | 413 | 431 |
| Norway | November, 1927... | 71 | 95 |
| Spain (Madrid) | November, 1927... | 125 | — |
| Sweden | December, 1927 ... | 54 | 72 (Oct.) |
| Switzerland | November, 1927... | 61 | 62 |
| United States | November, 1927... | 53 | 73 (June) |

* Native families.

With reference to statistics relating to employment in Great Britain and Northern Ireland, quoted on p. 806 of Part IV, 1927, of the *Journal*, the *Labour Gazette* recorded during July a slight decline in the volume of employment. There was little change during the next two months, but October again showed a slight decline, which persisted into November, being largely accounted for by seasonal increases of unemployment in the building trades and public work contracting. Employment showed an improvement, on the whole, during the first three weeks of December; but at the end of the month there was a sharp rise in the numbers unemployed, the effects of the dismissal of workers engaged for the Christmas trade and of the extended short-time working, which normally occur in the last week

of the year, having been accentuated by the severe weather conditions. These general statements of the *Labour Gazette* are illustrated by the following summary of the official statistics :—

| Date. | Percentage Un- employed among Insured Workpeople.* | Date. | Numbers (Insured and Uninsured) registered at Employment Exchanges, etc. |
|------------------|---|------------------|---|
| July 25 ... | 9.2 | July 25 ... | 1,055,000 |
| August 22 ... | 9.3 | August 29 ... | 1,076,000 |
| September 26 ... | 9.3 | September 26 ... | 1,075,000 |
| October 24 ... | 9.5 | October 31 ... | 1,132,000 |
| November 21 ... | 10.0 | November 28 ... | 1,172,000 |
| December 19 ... | 9.8 | December 19 ... | 1,127,000 |

* Exclusive of persons in the coal-mining industry disqualified for unemployment benefit by reason of trade disputes.

In a review of employment and wages during 1927 the *Labour Gazette* characterizes as the outstanding feature of the year the fact that, in spite of acute depression in some important industries, the average number of persons actually in employment reached a higher level than in any previous year, while the average percentage rate of unemployment among insured persons fell to a lower level than in any year since 1920. The average annual percentages of insured persons unemployed in Great Britain and Northern Ireland since the extension of the scheme of unemployment insurance in 1920 have been as follow :—

| | Per cent. | | Per cent. |
|------|-----------|----------|-----------|
| 1921 | . 17.0* | 1925 ... | 11.3 |
| 1922 | . 14.3 | 1926 ... | 12.5† |
| 1923 | . 11.7 | 1927 ... | 9.7 |
| 1924 | . 10.3 | | |

* Exclusive of persons in the coal-mining industry disqualified for unemployment benefit by reason of trade disputes.

From the second week in January there was a continuous expansion for a period of nearly five months, so that by the end of May an unemployment percentage rate of 8.7, and an aggregate of 987,176 persons on the registers of employment exchanges represented the best figures recorded since December, 1920. Although this level was not maintained throughout the rest of the year, the position at the end of December still compared favourably with that at the end of recent years, as is shown in the following proportions of insured workers recorded as unemployed in December of each of the years 1921 to 1927 :—

| | | Per cent. | | | Per cent. |
|----------------|-----|-----------|----------------|-----|-----------|
| December, 1921 | ... | 17.9 | December, 1925 | ... | 10.4 |
| " 1922 | ... | 12.8 | " 1926 | ... | 11.9 |
| " 1923 | ... | 10.6 | " 1927 | ... | 9.8 |
| " 1924 | ... | 10.7 | | | |

There was a slight reduction, during 1927, in the average level of rates of wages. In the industries and services for which statistics are available the changes reported during the year resulted in an aggregate net reduction of £389,000 in the weekly full-time wages of over 1,850,000 workpeople, and in a net increase of £30,400 in those of 280,000 workpeople. In 1926 there were net increases amounting to £133,000 in the weekly full-time wages of 420,000 workpeople, and net decreases amounting to £83,700 in those of 740,000 workpeople. The greater part of the net reduction of wages in 1927 occurred in the coal-mining industry (which accounted for over 70 per cent. of the total) and in the iron and steel, textile, clothing and transport industry groups. The largest body of workers who obtained an increase in wage rates in 1927 were the adult male time-workers in the engineering and certain other metal industries. It may be observed that in the case of agriculture, which is not covered by the above statistics, the minimum rates fixed under the Agricultural Wages (Regulation) Act for adult male labourers remained unchanged except in Northumberland and Durham, where there was a reduction, and Hampshire, where there was an increase. When account is taken of all the information in the possession of the Ministry of Labour, it is estimated that, at the end of 1927, the weekly full-time rates of wages of those classes of workpeople for whom particulars are available were between 70 and 75 per cent., on the average, above the level of the corresponding rates for August, 1914, compared with about 75 per cent. at the end of 1926. This estimate relates to rates of wages for a full normal week, and takes no account of changes of earnings resulting from alterations in the state of employment. As the number of hours constituting a full working week was reduced in nearly all industries in 1919 and 1920, the percentage increase in hourly rates of wages between 1914 and 1926-7 is greater than the increase in weekly rates.

The number of trade disputes of any significance causing stoppages of work, reported to the Ministry of Labour as beginning in 1927 in Great Britain and Northern Ireland, was 303, the smallest number recorded in any year during the whole period of forty years for which statistics are available. The number of workpeople directly involved (*i.e.* on strike or locked out) in these disputes was about 89,600; the

number indirectly involved was about 17,600. In addition, about 6,500 workpeople were involved, directly or indirectly, in thirteen disputes which began in 1926 and continued into 1927. The total number of workpeople involved in all disputes in progress in 1927 was thus about 113,700. The aggregate number of working days lost by these workpeople in the disputes was approximately 1,175,000; this figure is the lowest ever recorded by the Ministry of Labour.

Official statements as to employment in Germany, as summarised in the *Labour Gazette*, show from June to October a slow but steady expansion of the volume of employment. The total membership of statutory health-insurance societies, which covers between 14 and 15 million workpeople, showed monthly increases varying from 0.4 to 0.9 per cent. Over the same period trade union returns, based upon a total membership of nearly 4 millions, showed a steady decrease in the percentage of members unemployed from 6.3 on June 25 to 4.5 on October 29. Seasonal influences became more pronounced in the first half of November, and extended to other industries, particularly clothing, while in the second half of the month severe frost put an end to almost all outdoor occupations. As a result the trade union percentage of unemployment rose to 7.4 on 26th November. In France the total number of unemployed persons remaining on the "live register" of the Exchanges fell from 33,720 at the end of June to 24,177 at the end of October. After a rise to 28,474 a month later, the figure fell again to 26,292 at the end of the year. In the case of Norway the trade union percentage of unemployment fell from 21.6 at the end of May to 17.2 at the end of July, then rose till it reached 21.6 at the end of November. In each case the figure was less than the corresponding figure for a year before, the percentage at the end of November, 1926, being 25.2. For Swedish trade unions, returns are quoted by the *Labour Gazette* up to the end of November, when the proportion of unemployment was 12.5 per cent.; this figure was the result of a steady increase from 7.8 per cent. at the end of August, but still showed a slight improvement on the figure of 13 per cent. for the end of November, 1926. In the third Scandinavian kingdom, returns supplied to the Danish Statistical Department by trade unions and by the Central Employment Exchange showed the lowest seasonal figure of unemployment in 1927 as 16.2 per cent. at the end of September; thereafter the proportion rose to 21.6 per cent. at the end of November, and then jumped to 30.5 per cent. at the end of December, though even this high figure failed to reach the level of a year before, when the figure of unemployment was 32.2 per cent.

In Canada the index-number of employment is based upon returns received from approximately 6,300 firms employing over 886,000 workpeople, and has as its base the volume of employment during the week ending January 17, 1920. Standing at 108.4 on July 1, this index-number rose to 109.7 two months later, and thereafter fell till on December 1 it stood at 106.8. Throughout these months the index-number presented a favourable comparison with a year before, the figure on December 1, 1926, being 101.1, Canadian trade union returns are quoted by the *Labour Gazette* only to the end of October; they agree with the index previously quoted in representing the peak of employment in September, when the trade union percentage of unemployment fell to 3.1. By the end of October this figure had risen to 3.9 per cent. The monthly report on employment issued by the Federal Department of Labour Statistics at Washington is now based upon returns received from over 10,800 establishments in 54 of the principal manufacturing industries employing about 3 million workers. If the monthly average index-number of employment in these industries in 1923 be taken as 100, the corresponding figure for June, 1927, was 89.1. By the month of November this had fallen to 85.9, thus showing a general contraction of the volume of employment as compared with the preceding year in which the index-number for November (91.4) was slightly higher than that for June (91.3).

Biometrika (Parts I and II, July 1927) includes, in addition to several biometric and craniometric studies, several articles of more general statistical interest. Mr. Wishart deals with Bayes' Theorem, which gives for an inverse probability the ratio of an incomplete B function to a complete B function. The writer gives a variety of formulæ for the approximate quadrature, extending Bayes' own investigations. *Inter alia* he gives formulæ (and accompanying tables) for a quadrature analogous to Schlömilch's Formula in Inverse Factorials for the Error Function: the formulæ found as a rule are very rapidly convergent both for symmetrical and asymmetrical curves. Miss M. Tappan, Mr. P. Hall and Dr. Pearson contribute papers and notes on certain aspects of correlation, while Prof. Pearson considers the legitimacy of the assumptions in the application of the (P, X^2) . Goodness of Fit test: this is usually justified in samples from a normal population, except when they are very small. Prof. Oscar Anderson in a paper in German deals with the Variate Difference Method. Mr. S. C. Dodd considers the methods used by psychologists of employing correlations to analyse functions into unit factors (in the biological sense—not the mathematical), assuming

errors of observation do not follow the law of random sampling. L. Isserlis gives a bibliography of works by Chebysheff on Interpolation by Least Squares and a summary of the results; Prof. Romanovsky develops certain of these. In connection with the work of Russian statisticians, Prof. Pearson considers the criticisms of M. Greenwood and L. Isserlis in the pages of this *Journal* (1927, Vol. XC, pp. 347-52) on the relation between certain writings of the late Prof. Tschuprow and of Dr. J. Splawa-Neyman and Dr. A. E. R. Church. Dr. E. S. Pearson considers the work of Lotka and Volterra on the changes in the populations of animals preying on each other, and gives a summary of an examination in this connection by D'Ancona of some Italian fishery statistics.

The volume includes an interesting article by "Student" arising out of recent work on the rejection of observations in small samples. He points out that in laboratory work of routine analysis there exist certain semi-constant errors of obscure origin. Analyses made alongside one another tend to have similar errors, and this feature persists sometimes throughout the day or the week. This affects the assumptions made in the investigation of procedure for rejection of observations: the writer suggests how to derive limits at which repetitions should be made and beyond which outlying observations should be rejected.

The President and Council of the Royal Society have awarded the Buchanan Medal to Professor Major Greenwood for "statistical researches and other distinguished work in relation to public health." This medal, which is awarded every five years without limitation of nationality for work within the field of hygiene, was first awarded, in 1897, to the late Sir John Simon. Sir John Simon himself and one subsequent medallist, the late Sir W. H. Power (who like Sir John Simon filled the office of Medical Officer to the Local Government Board), did statistical work of importance, but they were also great administrators, and the present award is the first occasion on which the medal has been given to an investigator who has devoted himself mainly to the application of statistical methods to medical problems. Fellows of the Society will be pleased that this honour has been gained by one of the honorary secretaries.

OBITUARY.

LORD GEORGE HAMILTON, G.C.S.I.

THERE are very few names in the list of our Presidents during the last seventy years, Mr. Gladstone's and Lord Goschen's perhaps alone among them, which can compare with that of Lord George Hamilton for eminence in the public service of the country. His political career, including his long and distinguished tenure of two great offices of State, the Admiralty and the India Office, is so well known and was so admirably commemorated in the obituary notice which appeared in *The Times* of the 23rd September, 1927, the day after his death, that no further allusion is required here. Unlike some of the statesmen who, to the great advantage of this Society, have held the Office of President, Lord George Hamilton was a Fellow of long standing, having been elected in 1873; he had served on the Council in 1894-5, 1895-6, 1905-6, and 1906-7. The Society was fortunate in securing his acceptance of the Presidency just after the conclusion of his labours as Chairman of the Royal Commission on the Poor Law, and he held it for the sessions of 1910-11 and 1911-12, and again for the remainder of the session of 1915-16 after the death of Lord Welby.

No one within living memory has fitted the office with greater distinction than Lord George Hamilton. Not only did he bring to it unrivalled gifts of knowledge and experience, but he was a ready and accomplished speaker whose intervention in debate was always effective, and the charm and geniality of his manner made the transactions of the ordinary business of the Council and Committees, to which he devoted his administrative ability, a real pleasure to all concerned in it; while members of the Statistical Dinner Club will not soon forget the glow of anecdote and social and political reminiscence with which he enlivened its proceedings.

Lord George, besides being a donor to the Library on several occasions, contributed two papers to the Society, one in February 1894 on "Ocean Highways, their Bearing on the Food and Wages of Great Britain," emphasizing the necessity for a strong Navy; and the second, his Presidential Address in November, 1910, on "Statistical Survey of the Problem of Pauperism."

B. M.

STATISTICAL AND ECONOMIC ARTICLES IN RECENT PERIODICALS.

UNITED KINGDOM—

Accountants' Magazine—

November, 1927—The scope for accountancy in modern business : *W. Annan.*

December, 1927—Some notes on the accounting of a transport undertaking : *R. Stuart Pulcher.*

Annals of Eugenics. *October, 1927*—An analysis of the consumption of tobacco and alcohol in cases of tobacco amblyopia : Part I. General Discussion : *C. H. Usher.* Part II. Statistical Analysis : *E. M. Elderton.* On the relation between the prevalence of thyroid enlargement in children and mortality from cancer and other diseases : *P. Stocks* and *M. N. Karn.*

Bankers' Magazine—

August, 1927—The banking half-year. The economics of unemployment : *F. Morris.*

September, 1927—Progress of banking during 1926 : Profits and their distribution. Does the Bank Act need revising? Investment trust companies : *J. C. Backhouse.*

October, 1927—Progress of banking during 1926 : Proportion of cash to callable liabilities. Confidence, co-operation and hard work : *N. Crump.*

November, 1927—Banking during 1926 : Proportion of capital and reserves to deposits.

December, 1927—"Gilt-edged" securities (?) : *Scrutator.* Currency economy and banking development.

Biometrika. *July, 1927*—On the approximate quadrature of certain skew curves, with an account of the researches of Thomas Bayes : *J. Wishart.* On partial multiple correlation coefficients in a Universe of manifold characteristics : *M. Tappan.* On Criteria for factorising correlated variables : *S. C. Dodd.* Ueber die Anwendung der Differenzenmethode, etc. : II : *Oskar Anderson.* Notes on certain expansions in orthogonal and semi-orthogonal functions : I. Note on Chebyshev's interpolation formula : *L. Isserlis.* II. Note on orthogonalising series of functions and interpolation : *V. Romanovsky.* Multiple and Partial correlation coefficients in the case of an n -Fold variate system : *P. Hall.* Errors of routine Analysis : "Student." Another "Historical Note on the Problem of small samples" (Editorial). Note on the relation of the (P, X^2) Goodness of fit test to the distribution of standard deviations in samples from a normal population : *Karl Pearson.*

UNITED KINGDOM—*Contd.*
Economic Journal—

- September, 1927—Wage Policy and Unemployment : *Prof. A. C. Pigou*. Family allowances in New Zealand : *R. M. Campbell*. Wage adjustment in the coal industry : *J. A. Bowie*. Distribution of population between urban and rural districts : *E. W. Shanahan*. Crop-forecasting in England : *J. A. Venn*. Model form for statements of international balances : *J. M. K.* Present and future gold export points. *P. Einzig*.
 December, 1927—Rationalisation of Industry : *Prof. D. H. Macgregor*. British balance of trade, 1925-27 : *J. M. Keynes*. Colwyn committee, the income tax and the price level : *D. H. Robertson*. Population conference at Geneva : *Prof. A. M. Carr-Saunders*.

Eugenics Review—

- July, 1927—Actuarial treatment of official birth records : *R. A. Fisher*. Survey of birth-rates of the world : *H. W. Methorst*.
 October, 1927—Contribution to the Fundamentals of a Policy of population : *Prof. G. de Lapouge*. The numerous families of former times : *Prof. G. de Lapouge*. Darwinian interpretations : *Prof. E. W. MacBride*.

Financial Review of Reviews. October-December, 1927—Popular investment : an antidote to communism : *A. Wright*. The Future of coal : *H. S. Smith*.

Institute of Actuaries, Journal, July, 1927—Observations on
 (1) Errors of Age in the population of England and Wales, and
 (2) Changes in mortality indicated by the national records :
V. P. A. Derrice. The Actuary in commerce and industry :
E. W. Phillips.

Institute of Bankers, Journal—

- November, 1927—Critical and Historical account of the working of the American Federal Reserve banking system : *E. C. Gibson*.
 December, 1927—Inaugural address of the President, Mr. Frederick Hyde.

Ministry of Agriculture, Journal—

- August, 1927—A Census of an acre of roots : *J. Hunter-Smith* and *H. Rhys Williams*.
 September, 1927—International Economic Conference, 1927, Documents relating to Agriculture.
 December, 1927—Problem of Agricultural Marketing. Council of Agriculture for England.

Public Administration. October, 1927—Administrative Aspects of Social Insurance : *J. G. Bell*, *P. Y. Blundun*, and *E. Dreyer*.

Statistical and Social Inquiry Society of Ireland, Journal, October, 1927—Reform of the Irish census of population : *C. H. Oldham*. The first census of the Irish Free State and its importance to the country : *Sir W. J. Thompson*. A review of Irish agricultural prices : *T. Barrington*. Economic 'Barometers' : *J. Busteed*. Some causes and consequences of distributive waste : *J. Johnston*.

INDIA—

Indian Journal of Economics. July, 1927—The Hindu Taxation System: Dr. Balkrishna.

UNITED STATES—

Annals of the American Academy of Political and Social Science—September, 1927—Planning for city traffic.

November, 1927—Europe in 1927: an economic survey.

American Economic Review—

September, 1927—Orientation of Economics on Enterprise: F. B. Hawley. Factors affecting the bargaining power of workers in the glass bottle industry: H. La Rue Frain. Mathematics in economic and business statistics: W. L. Crum.

December, 1927—Rubber: a Case Study: William Orton. Interest Theory and Theories: H. J. Davenport. Going Value: Ben W. Lewis. Wage rates and use of machinery: George E. Bigge.

American Statistical Association, Journal, September, 1927—Index of consumption of fuels and water power: F. G. Tryon. Differential equations subject to error, and population estimates: H. Hotelling. Construction of an index-number of production: Woodlief Thomas. Study of spurious correlation: M. R. Neifeld. Methods of computing seasonal indexes: constant and progressive: F. L. Carmichael. Ratio of wages to value added by manufacturing processes in Massachusetts and the United States: M. Estelle Moulton and Raymond Pannier. Karsten's interpretation of the Harvard business indexes: Alvin H. Hansen. The growth curve: G. R. Davies. A Weekly Index of Distribution: D. C. Elliott.

Harvard Business Review. October, 1927—French industry and mass production: A. Siegfried. Economics of motor freight transportation: R. T. Wells.

Journal of Land and Public Utility Economics—

August, 1927—Valuation doctrine at the cross roads: Martin G. Glaeser.

November, 1927—Some measures and measurements of telephone utility taxation: H. B. Dorau and Marjorie Alexander.

Journal of Political Economy—

August, 1927—Theoretical considerations relating to supply: H. Schultz. Doctrine of comparative costs: Kemper Simson. Entrepreneur in economic literature: C. A. Tuttle.

October, 1927—Indian currency since the world war: J. L. Laughlin. A dynamical theory of economics: C. F. Roos. Mathematical and statistical economics: H. Schultz.

Monthly Labor Review. September, 1927—Problem of the worker displaced by machinery: J. J. Davies. Employee retirement systems: New York and New Jersey.

UNITED STATES—*Contd.*

Quarterly Journal of Economics—

August, 1927—Is there a biological law of human population growth? *A. B. Wolfe*. The American rice-growing industry: a study of comparative advantages: *A. H. Cole*. The gold exchange standard: *J. L. Laughlin*. Germany's foreign trade terms in 1899-1913: *N. Molodowsky*. The copper-mining industry in the United States, 1889-1925. II. Industrial organization: *F. E. Richter*.

November, 1927—Economics as a field of research: *A. A. Young*. The monetary situation in the United States as viewed from without: *R. A. Lehfeldt*. The National income of the Soviet Union: *L. N. Litoshenko*. Classification of land for taxation: *J. V. Van Sickle*.

The Record. June, 1927—Interpolation with modified coefficients: *J. F. Reilly*. Note on the "Most probable number of deaths": *H. L. Rietz*.

Review of Economic Statistics—

July, 1927—Revision of curve A, Speculation, of the Index of general business conditions: *W. L. Crum*. Analysis of bank statistics for the United States: (4) The National Banks, 1915-26: *A. A. Young*. Physical volume of production in the United States for 1926: *W. Floyd Maxwell*.

October, 1927—Theory of economic cycles based on the capitalistic technique of production: *A. Aftalion*. Wholesale commodity prices in the United States, 1795-1824: *W. B. Smith*. General theory of the correlation of time series of statistics: *M. K. Zinn*.

ARGENTINA—

Revista de Ciencias Economicas—

June, 1927—El balance de pagos y el comercio de cambios en un régimen de moneda depreciada: *Atilio Cabiati*. La Política de la Reserva Federal en el curso de los últimos años: *Gustavo Akerman*. La conquista de nuevos mercados para la producción argentina: *A. M. Castro*.

July, 1927—El Porvenir de la Economía Argentina: *L. Olariaga*. Algunos resultados de la experiencia monetaria contemporánea: *Benvenuto Griziotti*.

August, 1927—Las fuerzas creadoras en la economía nacional: *A. E. Bunge*. Los cartels y los trusts y su evolución: *P. de Rousiers*.

September, 1927—Intercambio comercial con Estados Unidos: *Luis Duhau*. La economía del petróleo nacional y su legislación: *E. M. Gonella*.

DENMARK—

Nationaløkonomisk Tidsskrift—

Part 3, 1927—Den danske Kronan efter 1914: *Bertil Ohlin*. Den tilfældige Udvaalgelses Metode i Statistiken: *Adolph Jensen*. Nogle Træk af den teoretiske Økonomis Udvikling i. U.S.A.: *Carl Iversen*.

Part 4, 1927—Den naturvidenskabelige Metodes Betydning for Samfundsøkonomien: *P. P. Svelstrup*. Den Britiske Præferencepolitik 1921–26: *J. Clan*.

Part 5, 1927—Skatterne gennem de sidste 25 Aar og deres Betydning for Ejendomsvaerdier og Pantersikkerhed: *K. J. Kristensen*. Produktions-Komponenternes Sammensætning: *Karsten Lemche*.

Part 6, 1927—Frankrigs Handels- og Toldpolitik i Hovedtræk under og efter Verdenskrigen: *J. C. Jørgensen*. Danske industrielle Virksomheders Beliggenhed: *H. N. Skade*. Arbejdsløn og Arbejdsløshed: *K. Vedel-Petersen*.

FRANCE—

Bulletin de Statistique et de Législation Comparée—

May, 1927—L'impôt sur les vélocipèdes en 1926.

June, 1927—L'impôt sur les voitures publiques en 1926. L'impôt sur les voitures automobiles en 1926.

July, 1927—Le commerce extérieur de l'empire colonial français depuis 1911. Les successions déclarées en 1925. Les successions de militaires de 1914–26. Les octrois en 1926.

August, 1927—Le produit des contributions indirectes en 1926. Les opérations de la Caisse nationale d'épargne en 1925.

September, 1927—La production des alcools en 1926. Les contributions directes en 1926. Les produits de l'enregistrement, des domaines et du timbre pendant les exercices 1913, 1914 et 1915 (chiffres définitifs).

Journal de la Société de Statistique de Paris—

July–September, 1927—Difficultés des évaluations économiques: *Yves-Guyot*. Contribution à l'étude du mouvement de la population: *M. Krummeich*.

October, 1927—L'avenir économique de nos colonies. Quelques statistiques: *G. Cadoux*. F. Y. Edgeworth et les indices des mouvements des prix: *L. March*.

November, 1927—La répartition de la population mondiale recensée vers 1920, et l'influence de l'immigration enregistrée en France au recensement de 1921: *M. Moine*.

December, 1927—Le problème des immigrés malades: *G. Ichok*.

FRANCE—*Contd.*

Journal des Économistes—

July, 1927—Quelques aperçus sur les Îles Britanniques : *Yves-Guyot*. Le relèvement économique de la Hongrie : *Emile Horn*. Les accidents du travail : *Victor Brillard*.

October, 1927—Le Brésil moderne : *R. J. Pierre*.

November, 1927—La houille et les métaux en Extrême-Orient : *Yves-Guyot*. Les cours des valeurs de chemins de fer en 1926 : *Georges de Nouvion*. Le budget de 1928 et la dette : *X*.

December, 1927—La Trésorerie des banques : *Pierre Cauboue*. La fiscalité mobilière en France et à l'étranger : *F. François-Marsal*.

La Réforme Sociale. July–August, 1927—Les difficultés de la vie matérielle : *M. Rodrigues*.

Revue d'Économie Politique—

May–June, 1927—Le problème des prévisions économiques aux États-Unis : *A. Aftalion*. La taxation de l'épargne : *Umberto Ricci*. La conférence économique internationale de Genève : *R. Hoffherr*. La vie économique en Allemagne : *H. Laufemberger*. La vie économique en Russie : *B. Eliacheff*.

July–August, 1927—Droits et intérêts étrangers en Chine (à suivre) : *Jean Escarra*. Observations sur l'intérêt du capital : *G.-H. Bousquet*.

September–October, 1927—L'économie pure du système économique présent : *E. Antonelli*. Les index économiques : *René Roy*.

GERMANY—

Konjunkturforschung (Vierteljahrshefte)—

Part 2, 1927—Saisonschwankungen in Warenhausumsätzen. Monopole und Konjunktur. Deutschlands Betriebskapital.

Sonderhefte, 1927, Nr. 3—Die Agrarkredite. Nr. 4. Die Analyse von Wirtschaftskurven.

Weltwirtschaftliches Archiv. October, 1927—Zur Theorie der Wechselkurse : *Alexander Mahr*. Zahlungsbilanz, Kaufkraft und Wechselkurs : *Dr. Karl Koranyi*. Die weltwirtschaftliche Lage im Spiegel des Schrifttums der Weltwirtschaftskonferenz : *Dr. Karl Pöribram*.

Zeitschrift für die gesamte Versicherungs-Wissenschaft. October, 1927—Die internationale Regelung der Krankenversicherung : *Dr. Stein*. Das Deutsche Reichsgesetz über die Arbeitslosenversicherung in seinen leitenden Ideen : *Dr. Bernhard*.

HUNGARY—

Revue de la Société Hongroise de Statistique—

January–March, 1927—Divorces et suicides, Leurs causes et les moyens de les combattre (Enquête).

November, 1927—Résultats récents de la statistique de la mortalité au-dessous de un an (1919–26) : *Dr. Theodore Saile*. Résultats de la récolte de 1926 en Hongrie suivant les catégories de superficie d'exploitations : *E. Sajóhelyi*.

ITALY—

Le Assicurazioni Sociali. September–October, 1927—L'assicurazione obbligatoria contro la tubercolosi: *G. Belluzzo*. La Polizza unica del lavoro. Difficoltà di realizzazione: *L. Pezzoli*. Le Classi medie e le assicurazioni sociali: *V. Magaldi*. Psicologia industriale e assicurazioni in Inghilterra: *F. W. Lawe*.

Giornale degli Economisti e Rivista di Statistica—

July, 1927—Note sopra un recente esperimento monetario: *Antonio Vlam*.

August, 1927—Gli investimenti industriali in regime di svalutazione: *G. Motta*. La teoria dell'ammortamento dell'imposta e l'imposta personale sul reddito: *R. Fubini*.

October, 1927—La composizione razziale della popolazione Americana: *F. Savorgnan*. Osservazioni sul commercio fra l'Italia e l'Estero nei primi nove mesi del 1927: *G. Mortara*.

November, 1927—Alcuni confronti internazionali in materia di rivalutazione monetaria: *G. Mortara*.

Giornale di Matematica Finanziaria. June–October, 1927—Dopo l'VIII Congresso degli Attuari: *F. Insolera*. Su la rappresentazione analitica di una distribuzione di frequenze mediante una serie di Hermite-Charlier: *G. Santacroce*.

La Riforma Sociale—

July–August, 1927—Francesco Isidoro Edgeworth: *A. Loria*. Le ricerche scientifico-industriali in Inghilterra: *Bruno Fodà*.

September–October, 1927—Osservazioni sul principio produttivistico di un sistema tributario di guerra. *A. Cabiati*. L'Imposta sul celibato nella legislazione Italiana: *F. A. Rèpaci*. La misura della pressione dell'imposta: *Antonio Deni*.

November–December, 1927—Vilfredo Pareto—Lettera autobiografica: *E. Sella*. La Riforma Agraria in Rumenia e i suoi primi effetti: *A. Schiavi*.

ROUMANIA—

L'Économiste Roumain—

August, 1927—Le mouvement de la population dans la Grande Roumanie: *L. Colesco*.

October, 1927—La réforme agraire en Roumanie: *A. Nasta*.

November, 1927—L'industrie métallurgique en Roumanie: *G. Ioanitziu*. La création des marchés d'exportation: *Agra*.

SWEDEN—

Ekonomisk Tidskrift. Häft. 7–9, 1927—Europas penningpolitik: *D. Davidson*.

SWITZERLAND—

Schweizerischen Statistischen Gesellschaft, Zeitschrift. Heft 3, 1927—Betriebskosten schweizerischer Irrenanstalten 1921–1925: *Dr. W. Grütter-Mojon*. Das schweizerische Volkseinkommen im Jahre 1924: *Dr. Julius Wyler*.

INTERNATIONAL—

International Labour Review—

August, 1927—The evolution of a wage adjustment system : II :
J. R. Bellerby. The correlation between seasonal unemployment and certain social and economic phenomena : *J. Janko.*
 Calendar reform : *J. H. Richardson.*

September, 1927—The International Economic Conference.
 Evolution of a wage adjustment scheme : III : *J. R. Bellerby.*

October, 1927—Fifty years of Legislation on Occupation Diseases in Switzerland : *Dr. W. Lauber.* Population Problem and Industrialisation in Japan : *I. F. Ayusawa.*

November, 1927—Money and unemployment : *H. Fuss.*
 Mothers' allowances in North America : *E. Haultain.*

Metron. Vol. VI, Nos. 3-4—Zur Praxis der Ausgleichung der statistischen Reihen : *B. Lagunoff.* Beiträge zur Statistik der Mortalitäts-Unterschiede zwischen den beiden Geschlechtern : *F. Burkhardt.* La Stagionalità delle nascite nelle singole famiglie : *L. Galvani.* Al. A. Tschouproff : *N. S. Tschetwerikoff.*
World's Health. *December, 1927*—Ten years' relief and famine prevention in China : *W. Souter.*

LIST OF ADDITIONS TO THE LIBRARY.

Since the issue of Part IV, 1927, the Society has received the publications enumerated below :—

1.—OFFICIAL PUBLICATIONS.

(a) United Kingdom and its several Divisions.

United Kingdom—

Food Council. Report on Fish Prices. 53 pp. London, 1927. Price 1s. 3d. net. (H.M. Stationery Office.)

Industrial Assurance Commissioner. Statistical summaries, 1924–26. 7 pp. London, 1927. Price 6d. net. (The Commissioner.)

Labour, Ministry of—

A dictionary of occupational terms. 1927. v + 564 pp. fol. London, 1927. Price £1 1s. net. (H.M. Stationery Office.)

Effect of the Unemployment Insurance Bill on the number of persons drawing benefit. 6 pp. London, 1927. Price 2d. net. Cmd. 2987. (*Id.*)

Memorandum on certain points concerning the statistics of unemployment and of poor law relief. 7 pp. London, 1927. Price 2d. net. Cmd. 2984. (*Id.*)

Overseas Trade, Department of—

Reports on Financial and Economic Conditions, etc., as follows : Austria (Oct. 1927), 1s. 6d., China (June 1927) and Trade of S. Manchuria, 1s. 6d.; Egypt (May 1927), 2s.; Germany (July 1927), 3s. 6d.; Greece (May 1927), 1s. 6d.; Honduras and El Salvador, 1s. 6d.; British Trade in India, 4s.; Morocco, Algeria, Tunisia, Tripolitana, Cyrenaica, 4s. 6d.; Panama and Canal Zone and Costa Rica, 1s. 6d.; Roumania (1926), 1s.; Turkey (May 1927), 1s.; United States (May–June), 3s. (The Department.)

Sea-borne trade of Bombay Presidency. Summary of Official Report, 1927. 16 typed pp. (*Id.*)

Trade, Board of—

Third Census of Production, 1924. Preliminary Reports.

Nos. 19. Butter, cheese, condensed milk and margarine, saddlery, harness, travelling bags and leather goods, umbrella and walking-stick, artificial flower and ornamental feather trades. 2 pp. 20. Pellmongery, leather, tool and implement, cutlery trades. viii pp. 21. Hardware, hollow-ware and bedstead, anchor, chain, nail, bolt and nut, screw and rivet, basket and wicker-work, laundry, cleaning and dyeing trades. viii pp. 22. Non-ferrous metals (smelting, rolling and casting), finished brass, watch and clock making trades. xii pp. Price 6d. each. 23. Bleaching, dyeing, printing and finishing, lace, jewellery, gold, silver and electro-plate, fish-curing trades. viii pp. 24. Public utility services. (Gas-works, water-works, generation of electricity, work carried out by local authorities (other than gas, electricity and water undertakings), canals, docks, harbours, etc., tramway and light railway undertakings. xvi pp. Price 3d. each. 25. Bread and biscuit, manufactured stationery, scientific instruments, appliances and apparatus, film printing trades. xii pp. 26. Metalliferous mines and quarries, salt mines, brine pits and salt works, slate mines and quarries, carriage, cart and wagon

trades. viii pp. (2 parts.) 27. Cocoa and sugar confectionery, quarries, other than metalliferous and slate, building and contracting trades. viii pp. 28. Building materials and glass, ivory, horn, picture frame and fancy articles, gold and silver refining trades. viii pp. 29. Flock and rag trades, woollen and worsted trades, clothing and millinery trades, fur trade, chemical and allied trades, explosives and fireworks trades, oil and tallow trades, upholstery trades. xii pp. Price 6d. each. London, 1927-28. (The Board.)

England and Wales—

Health, Ministry of. Circulars 820 and 1004 relating to public health (infectious diseases). London, 1927. (H M. Stationery Office.)

Industrial Fatigue Research Board—

Reports. No. 43. A study of telegraphists' cramp. By *M. Smith, M. Culpin* and *E. Farmer*. iv + 46 pp. 1927, 1s. 6d.; No. 44. The physique of women in industry: a contribution towards the determination of the optimum load. vi + 142 pp. 1927, 5s.; No. 48. Artificial humidification in the cotton weaving industry. By *A. Bradford Hill*. iv + 78 pp. 1927, 2s. 6d.

Registrar-General. Decennial supplement, 1921. England and Wales. Part I. Life Tables. iv + 71 pp. fol. London, 1927. Price 2s. net. (The Registrar-General.)

London County Council. Scholarships and training of teachers, handbooks. Session 1927-28. 109 pp. London: P. S. King, 1927. Price 3d. (The Education Officer.)

Stepney. Electricity supply undertaking. Abstract of accounts, 1927. vii + 18 pp. London: Vail & Co., 1927. (Mr. Dodsworth.)

Scotland—

Education Department—

Circular 30 (1927). Leaving certificate examination, 1928. Day school certificate (higher) examination, 1928. 19 pp. London, 1927. Price 2d. net. (The Department.)

(b) India, Dominions and Protectorates.

India—

District Gazetteers. Punjab Vol. VII. Part A. Multan Dist. 1923-24. Price 12s. Sind. B. Vol. II. Hyderabad Dist. Price 11s. B. Vol. IV. Larkana Dist. Price 10s. Agra and Oude—Supplementary notes and statistics. Balla Dist. (Price 14 as.); Hardoi Dist. (Price 13 as.). 5 vols. 1926-27. (High Commissioner for India.)

Bombay Presidency. Labour Office. Report on an enquiry into middle class unemployment. 102 pp. Bombay, 1927. Price 4s. 6d. (The Office.)

Australia—

Census, 1921. Vol. II. Detailed tables and statistician's report. 1 vol. fol. Melbourne, 1927. Price 30s. (The Bureau.)

New South Wales. Railways and Tramways Commission. Electrification of Sydney and suburban railways. (Reprint.) 382 pp. Sydney, 1927. (The Commission.)

Canada—

Natural Resources Intelligence Service. Map showing transportation and commercial development. 1927. (The Service.)

Kenya—

Report on the non-native census enumeration made in the Colony and Protectorate of Kenya. February 1926. Nairobi, The Government, 1927. (Statistical Department.)

Mauritius—

Census, 1921. Final report. 38 + cclxxi pp. fol. Port Louis, 1926. (Secretary of State for the Colonies.)

(b) India, Dominions and Protectorates--*Contd.***Union of South Africa—**

Fourth Census, May, 1926. Part 1. Population. Number, sex, and geographical distribution of the European population. Pretoria. Govt. Printing and Stationery Office. 1927. (Office of Census.)

(c) Foreign Countries.

Bulgaria—

Comptes de ménage, 1925. I. Ville de Sofia. ix + 55 pp. Sofia, 1927. (Direction Générale de Statistique.)

Recensement de la population, 1920. Tome I. xviii + 267 pp. Tome II. iv + 281 pp. 2 vols. Sofia, 1927. (*Id.*)

Statistique des élections des députés pour la XX^eme. assemblée nationale ordinaire. ix + 99 pp. Sofia, 1927. Price 182 lévas. (*Id.*)

Cuba—

Automoviles, 1926-27. (Sheets.) (Comisión Nacional.)

Czecho-Slovakia—

Enseignement, 1922-23. Partie II. li + 14 + 487 pp. Prague, 1925. Price 70 Kč. (L'Office de Statistique.)

Recensement de la population, 1921. Tome II. xvi + 363 pp. Prague, 1925. Price 80 Kč. (*Id.*)

Denmark—

Folkhejskoler og Landbrugsskoler, 1921/22-1925/26. 59 pp. Kobenhavn, 1927. Price Kr. 1.00. (Stat. Departement.)

Kommune- og Havneegnsskaber, 1915/16-1922/23. 90 + 165 pp. Kobenhavn, 1927. Price Kr. 5.00. (*Id.*)

Estonia—

Elections au Parlement de 15-17 Mai 1926. 48 pp. Tallinn, 1927. (Bureau Central.)

Situation Financière des Sociétés Anonymes et des Sociétés Coopératives. au 1.1.1926 (suivant les exigences de la loi sur les bilans-or). 34 pp. Tallinn, 1927. (*Id.*)

France—

Recensement général. 1921. Tome I. Partie III. Population active, établissements. 176 pp. Paris, 1927. (Statistique Générale.)

Travaux Publics, Ministère des. Recensement de la batellerie, 1926. 79 pp. Paris, 1927. Price 29 frs. (Le Ministère.)

Germany—

Reichsgesundheitsamt. Veröffentlichungen. Gesamt-Inhaltsverzeichnis zu den Jahrgängen 1901 bis einschliesslich 1925. iv + 200 pp. Berlin, 1927. (Reichsgesundheitsamt.)

Berlin. Erster Verwaltungsbericht der neuen Stadtgemeinde Berlin (1 Oct. 1920-31 March 1924). Heft 2a. Finanzwesen. 81 pp. Heft 3. Gesundheitswesen. 148 pp. Berlin. (Statistisches Amt.)

Hungary—

Mortalité par la tuberculose, 1901-1915. 148 pp. Budapest, 1927. (L'Office Central de Statistique.)

Mouvement de la navigation et des marchandises à Fiume, 1914-15. 24 + 270 pp. Budapest. (*Id.*)

Recensement de la population, 1920. II. 56 + 195 pp. Price 7 pengös. III. xix + 17 + 543 pp. Price 13 pengös. 2 parts. Budapest, 1927. (*Id.*)

Italy—

Compendio statistico, 1927. Anno I. xii + 123 pp. + vii tables. Roma, 1927. (Istituto Centrale di Statistica.)

(c) Foreign Countries—*Contd.***Jugo-Slavia—**

Recensement du bétail de ferme, 1921. xxix + 415 pp. Sarajevo, 1927. Price 100 dinars. (L'Office de Statistique.)

Netherlands—

Amsterdam. Comptes de ménage de 212 familles de différente position sociale, 1 Oct., 1923–30 Sept., 1924. x + 153 pp. Amsterdam, 1927. (Bureau Municipal.)

Poland—

Recensement général, 1921. Logements, population, professions. Département de Lwów. xv + 374 pp. Terres en possession commune. Tableaux. vi + 77 pp. Logements, population, professions. Département de Białystok. xvi + 272 pp. Bâtiments. Tableaux. vi + 80 pp. Départements de l'Est. xxiv + 33 pp. Département de Kielce. xvi + 303 pp. Département de Kowogródok. xvi + 208 pp. Département de Stanisławow. xvi + 275 pp. (5 vols.) Varsovie, 1926–27. (L'Office Central de Statistique.)

Prussia—

Statistisches Landesamt. Die Wahlen zum Preussischen Landtag, 1924. Teil II. 120 pp. Berlin, 1927. Price 4.80 Rsmk. (Stat. Landesamt.)

Roumania—

Die Vegetation von Bessarabien. Von Dr. T. Savulescu. 53 pp. and tables. București, 1927. (Le Ministère de l'Agriculture.)

Die Bedeutung und die Rentabilität der Viehzucht in Rumanien nach der Agrarreform. Von Dr. N. D. Cornățeanu. 114 pp. București, 1927. (*Id.*)

Sweden—

Folkräkningen, 1920. V. Yrkesräkningen II: Yrke, inkomst och förmögenhet kombinerade inbördes samt med kön, civilstånd och ålder. x + 598 pp. Stockholm, 1927. (Stat. Centralbyrån.)

Kommunala valen, 1926–27. x + 70 + 73 pp. Stockholm, 1927. (*Id.*)

Switzerland—

VII^e Recensement des ruches d'abeilles, 1926. 8 + 76 pp. Bern, 1927. Price 3.50 frs. (Bureau Fédéral de Statistique.)

III^e Recensement de la volaille de la Suisse, 21 avril 1926. 8 + 76 pp. Berne, 1927. Price 3.50 frs. (*Id.*)

Bern (Kanton). Mitteilungen, 1927. Lieferung II. I. Die Erwerbstätigkeit in Handwerk und Industrie im Kanton Bern. II. Betreibungs- und Konkursstatistik im Kanton Bern. 104 pp. Bern, 1927. (Stat. Bureau.)

Bern (Stadt). Todesfälle und Todesursachen, 1911–1925. 196 pp. Bern, 1927. (Stat. Amt.)

United States—*Agriculture, Department of,*

Circular, No. 16. Some economic aspects of the marketing of milk and cream in New England. By W. A. Schoenfeld. 74 pp. Oct. 1927. (The Department.)

Dept. Bulletins, Nos. 1446. Cost of producing winter wheat and incomes from wheat farming in Sherman County, Ore. 40 pp. 1447. Cost of using horses, tractors and combines on wheat farms in Sherman County, Ore. 44 pp. 1926. 10 cents. 1455. Incomes from farming and cost of apple production in the Shenandoah Valley, Frederick County, Va. 30 pp. 10 cents. 1475. Production and utilization of fats, fatty oils, and waxes in the United States. 36 pp. 10 cents. 1479. Speculative transactions in the 1926 May wheat future. 56 pp. 15 cents. 1480. Reliability and adequacy of farm-price data. 66 pp. 15 cents. 1485. The suitability of American woods for paperpulp. By S. D. Wells and J. D. Rue. 102 pp. 20 cents. 1486. Highway bridge location. By C. B. McCullough. 32 pp. 15 cents. 1488. Manufacturing tests of cotton of the white grades of the universal standards for American cotton. By H. H. Willis. 30 pp. 1927. 10 cents. (The Department.)

(c) Foreign Countries—*Contd.*United States—*Contd.**Agriculture, Department of—Contd.*

Dept. Circulars, 413 Extent and causes of rejections of boxed apples from the state of Washington, seasons 1922–25. By *R. R. Paillhorp* and *J. W. Park*. 16 pp. 414. May. Sea-island and Meade cotton in the south-eastern states. By *O. F. Cook* and *C. B. Doyle*. 20 pp. 5 cents. 416. Demand, marketing, and production of Oregon and Washington prunes. 48 pp. 420. The peach situation in the southern states. By *M. R. Cooper* and *J. W. Park*. 24 pp. 15 cents. Washington, 1927. (The Department.)

Farmers' Bulletins, Nos. 1524. Farm poultry raising. By *M. A. Jull*. ii + 28 pp. 5 cents. 1532. Dairy-herd improvement through co-operative bull associations. By *J. C. McDowell*. ii + 14 pp. 5 cents. 1533. June. Rat control. By *J. Silver*. ii + 21 pp. 5 cents. Washington, 1927. (The Department.)

Technical Bulletin, No. 13 Practices and costs of cotton-gin operation in North-Central Texas, 1924–25. By *J. S. Hathcock*. 59 pp. Washington, July 1927. (The Department.)

Leaflet No. 3. Improved sanitation in milk production. 8 pp. 1927. (The Department.)

Miscellaneous Circulars, Nos. 93. Direct production costs of broken stone. By *G. E. Ladd*. 71 pp. 25 cents. 97. Co-operation in agriculture. A selected and annotated reading list. 76 pp. 15 cents. 105. Federal-aid Road Act. 30 pp. 5 cents. 106. Emergency crops for flooded lands in the Mississippi Valley. By *J. A. Evans*. 8 pp. Washington, 1927. (The Department.)

Separate from Yearbook 1925. No. 930. Marketing fruits and vegetables. By *A. W. McKay*, *H. W. Samson* and others. pp. 623–710. 1927. (The Department.)

Statistical Bulletins, Nos. 14. Prices of farm products received by producers. 1. North Atlantic states. 121 pp. 20 cents. 15. Prices of farm products received by producers. 2. The North Central States. 203 pp. 30 cents. 17. Prices of farm products received by producers: (4) The mountain and Pacific states. 152 pp. 25 cents. Washington, 1927. (The Department.)

Porto Rico Agricultural Experiment Station, Mayaguez, P.R. Report, 1925. 40 pp. Washington, 1927. (The Department.)

Census, Bureau of—

Bulletin 161. Stocks of leaf tobacco, 1926 48 pp. Washington, 1927. Price 10 cents. (The Bureau.)

Census of agriculture, 1925. Summary statistics, by states. vi + 77 pp. Washington, 1927. Price 15 cents. (The Bureau.)

Census of manufactures, 1925. Statistics for industries, states and cities. 191 pp. Washington, 1927. Price 25 cents. (The Bureau.)

Children's Bureau—

Separate from Publication, No. 143. Enuresis. pp 33–40. Separate from Publication No 176. The extent of child dependency and delinquency in seven Pennsylvania counties. By *H. R. Deardorff*, *Ph.D.* 22 pp. Washington, 1927. (The Bureau.)

Alcoholism among parents of juvenile delinquents. By *Alice Channing*. (Reprint.) pp. 357–383. 1927. (American Embassy.)

Publications, Nos. 177. The Children's Bureau of Cleveland. A study of dependent children in Cleveland, Ohio. By *H. M. Leete*. v + 98 pp. Price 15 cents. 178. The promotion of the welfare and hygiene of maternity and infancy. vi + 95 pp. 20 cents. Washington, 1927. (The Bureau.)

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REVENUE OF THE UNITED KINGDOM.

*Net Produce in Quarters of 1927, and in Financial Years ended
March 31, 1926-27, 1925-26, 1924-25, 1923-24.*

(000's omitted.)

| QUARTERS, ended | March 31, 1927. | June 30, 1927. | Sept. 30, 1927. | Dec. 31, 1927. | Total for calendar year 1927. |
|--|--------------------|-------------------|--------------------|-------------------|--|
| | £ | £ | £ | £ | £ |
| Customs | 27,607 | 26,354 | 28,220 | 29,829 | 112,010 |
| Excise | 30,198 | 32,325 | 32,667 | 41,559 | 136,749 |
| Stamps and Estate Duties | 29,480 | 20,900 | 24,360 | 27,270 | 102,010 |
| Land Tax House Duty and Mineral Rights Duty | 730 | 100 | 20 | 20 | 870 |
| Postal Service | 9,800 | 8,050 | 9,950 | 10,200 | 38,000 |
| Telegraph Service | 1,550 | 1,800 | 1,400 | 1,550 | 5,800 |
| Telephone Service | 4,500 | 4,550 | 4,600 | 4,700 | 18,350 |
| | 103,865 | 93,579 | 101,217 | 115,128 | 413,789 |
| Property and Income Tax, in- cluding Supertax | 172,794 | 35,175 | 55,315 | 26,200 | 289,514 |
| | 276,659 | 128,754 | 156,532 | 141,328 | 703,303 |
| Excess Profits Duties, etc. | 4,500 | — | — | — | 1,500 |
| Corporation Profits Tax | 1,060 | 540 | 400 | 340 | 2,310 |
| Motor Vehicle Duties | 14,407 | 3,823 | 2,950 | 2,001 | 23,271 |
| Crown Lands | 170 | 270 | 270 | 310 | 1,050 |
| Interest on Sundry Loans | 6,985 | 5,156 | 6,901 | 5,122 | 24,161 |
| Miscellaneous— | | | | | |
| Ordinary receipts | 8,673 | 2,116 | 7,665 | 6,892 | 25,316 |
| Special receipts | 14,226 | 7,511 | 5,369 | 7,614 | 35,019 |
| Totals | 326,680 | 148,470 | 180,116 | 164,027 | 819,293 |

| YEARS, ended March 31, | 1926-27. | 1925-26. | 1926-27 (compared with 1925-26). | | Corresponding years. | |
|---|----------|----------|--|-----------|-------------------------|----------|
| | | | Increase. | Decrease. | 1924-25. | 1923-24. |
| | £ | £ | £ | £ | £ | £ |
| Customs | 107,515 | 103,487 | 4,028 | — | 90,314 | 119,958 |
| Excise | 132,978 | 134,560 | — | 1,582 | 135,128 | 147,970 |
| Stamps and Estate Duties ... | 92,070 | 85,900 | 6,170 | — | 82,300 | 79,370 |
| Land Tax, House Duty and Mineral Rights Duty | 880 | 950 | — | 70 | 1,450 | 2,760 |
| Postal Service | 35,600 | 35,750 | — | 150 | 31,850 | 32,810 |
| Telegraph Service | 5,900 | 5,650 | 250 | — | 5,600 | 5,570 |
| Telephone Service | 17,350 | 15,950 | 1,400 | — | 15,000 | 14,300 |
| | 392,293 | 382,247 | 11,818 | 1,802 | 373,672 | 402,858 |
| Property and Income Tax, including Super-tax | 300,627 | 327,921 | — | 27,294 | 336,516 | 329,971 |
| | 692,920 | 710,168 | 11,818 | 29,096 | 710,188 | 732,829 |
| Excess Profits Duties, etc. ... | 4,500 | 2,000 | 2,500 | — | 700 | — |
| Corporation Profits Tax | 3,970 | 11,670 | — | 7,700 | 18,100 | 23,310 |
| Motor Vehicle Duties | 21,393 | 18,056 | 3,337 | — | 16,161 | 14,691 |
| Crown Lands | 1,010 | 950 | 60 | — | 960 | 920 |
| Interest on Sundry Loans | 22,854 | 14,944 | 7,910 | — | 11,941 | 12,607 |
| Miscellaneous— | | | | | | |
| Ordinary receipts | 28,214 | 17,349 | 10,865 | — | 14,419 | 15,981 |
| Special receipts | 30,840 | 36,924 | — | 6,084 | 26,963 | 36,801 |
| Totals | 805,701 | 812,061 | 36,520 | 42,880 | 799,485 | 837,169 |
| | | | NET DEC. £6,360 | | | |

Values (c.i.f. of Imports* into the United Kingdom for the years 1925-26-27.

(From the Monthly Trade Returns, December, 1927.)

| | Year ended December 31, | | | Increase (+) or Decrease (-) in 1927 as compared with 1926. | Increase (+) or Decrease (-) in 1927 as compared with 1925. |
|---|-------------------------|-------------|-------------|--|--|
| | 1925. | 1926. | 1927. | | |
| I. FOOD, DRINK AND TOBACCO— | £ | £ | £ | £ | £ |
| A. Grain and flour | 111,189,980 | 99,112,741 | 110,970,721 | +11,857,980 | — 219,259 |
| B. Feeding-stuffs for animals .. | 9,076,685 | 6,804,999 | 8,413,475 | + 1,613,476 | — 658,210 |
| C. Meat | 122,388,696 | 114,267,466 | 103,557,251 | -10,710,215 | — 18,831,445 |
| D. Animals, living, for food .. | 17,575,689 | 16,981,944 | 16,009,975 | - 1,471,969 | — 2,065,714 |
| E. Other food and drink, non- dutyable | 174,979,809 | 166,401,732 | 165,019,803 | - 1,381,927 | — 9,060,004 |
| F. Other food and drink, dutyable .. | 117,847,527 | 108,505,368 | 116,060,041 | + 8,154,673 | — 1,187,486 |
| G. Tobacco | 17,042,632 | 17,714,291 | 19,202,815 | + 1,488,524 | + 2,160,183 |
| Total, Class I | 570,101,016 | 529,788,541 | 539,339,083 | + 9,550,542 | — 30,761,935 |
| II. RAW MATERIALS AND ARTICLES MAINLY UNMANUFACTURED— | | | | | |
| A. Coal | 20,272 | 42,883,815 | 6,611,420 | -36,272,425 | + 6,591,148 |
| B. Other non-metallic Mining and quarry products and the like | 5,739,790 | 5,565,717 | 6,258,477 | + 692,730 | + 524,687 |
| C. Iron ore and scrap | 5,108,050 | 2,776,819 | 5,708,593 | + 2,931,749 | + 600,518 |
| D. Non-ferrous metalliferous ores and scrap | 16,494,459 | 13,229,139 | 15,733,559 | + 504,120 | + 760,900 |
| E. Wood and timber | 16,496,039 | 39,259,493 | 49,670,619 | +10,411,126 | + 3,174,580 |
| F. Raw cotton and cotton waste .. | 125,791,128 | 54,448,356 | 67,733,332 | -10,711,524 | — 58,057,296 |
| G. Wool, raw, and waste, and woollen rags | 75,828,308 | 65,144,153 | 63,810,092 | - 1,603,161 | — 11,987,318 |
| H. Silk, raw, knubs and noils .. | 1,669,823 | 2,022,269 | 1,831,631 | - 190,638 | + 161,808 |
| I. Other textile materials | 18,144,663 | 13,543,232 | 16,161,307 | + 2,621,075 | + 1,980,356 |
| J. Oil seeds, nuts, oils, fats, resins and gums | 55,493,356 | 45,478,035 | 45,130,878 | - 347,157 | — 10,362,978 |
| K. Hides and skins, undressed .. | 21,802,347 | 19,506,829 | 23,004,887 | + 3,498,058 | + 1,202,640 |
| L. Paper-making materials | 11,107,167 | 11,942,667 | 12,792,944 | + 850,277 | + 1,685,777 |
| M. Rubber | 29,396,845 | 33,495,016 | 25,481,325 | - 8,013,691 | — 8,915,520 |
| N. Miscellaneous raw materials and articles mainly un- manufactured | 11,696,301 | 10,587,836 | 11,998,289 | + 1,410,433 | + 301,788 |
| Total, Class II | 424,783,148 | 392,183,466 | 351,961,728 | -40,221,728 | — 72,821,420 |
| III. ARTICLES WHOLLY OR MAINLY MANUFACTURED— | | | | | |
| A. Coke and manufactured fuel .. | 9,750 | 2,515,811 | 135,543 | - 2,380,302 | + 125,762 |
| B. Earthenware, glass, abra- sives, &c. | 10,091,981 | 11,510,093 | 11,863,422 | + 353,329 | + 1,771,541 |
| C. Iron and steel and manu- factures thereof | 23,882,666 | 29,512,158 | 34,038,410 | + 4,526,252 | + 10,155,744 |
| D. Non-ferrous metals and manufactures thereof .. | 33,121,102 | 37,096,791 | 32,606,711 | - 4,490,050 | — 5,514,361 |
| E. Cutlery, hardware, imple- ments, and instruments .. | 9,802,177 | 6,588,485 | 7,306,646 | + 718,161 | — 2,495,531 |
| F. Electrical goods and apparatus .. | 4,274,135 | 3,787,290 | 4,256,119 | + 468,829 | — 18,036 |
| G. Machinery | 12,071,800 | 12,782,879 | 15,901,428 | + 3,118,549 | + 3,429,628 |
| H. Manufactures of wood and timber | 6,226,350 | 6,799,445 | 7,313,916 | + 514,471 | + 1,087,666 |
| I. Cotton yarns and manu- factures | 9,830,137 | 8,652,129 | 9,911,677 | + 1,259,548 | + 81,540 |
| J. Woollen and worsted yarns and manufactures | 15,119,784 | 14,977,317 | 16,097,891 | + 1,120,574 | + 978,107 |
| K. Silk and silk manufactures .. | 22,641,332 | 16,833,837 | 16,190,017 | - 643,840 | — 6,451,315 |
| L. Manufactures of other textile materials | 18,192,130 | 14,949,817 | 15,783,423 | + 833,606 | — 2,408,707 |
| M. Apparel | 21,133,360 | 17,183,258 | 18,668,739 | + 1,485,481 | — 2,464,621 |
| N. Chemicals, drugs, dyes and colours | 14,386,493 | 13,448,698 | 15,469,483 | + 20,787 | + 1,082,992 |
| O. Oils, fats and resins, manu- factured | 30,341,129 | 43,875,255 | 38,624,063 | - 5,251,192 | + 2,282,934 |

* The value of the Imports represents the cost, insurance and freight; or, when goods are consigned for sale, the latest sale value of such goods.

Values (c.i.f.) of Imports for the years 1925-26-27—Contd.

(From the Monthly Trade Returns, December, 1927.)

| | Year ended December 31, | | | Increase (+) or Decrease (—) in 1927 as compared with 1926. | Increase (+) or Decrease (—) in 1927 as compared with 1925. |
|--|-------------------------|---------------|---------------|--|--|
| | 1925. | 1926. | 1927. | | |
| III. ARTICLES WHOLLY OR MAINLY MANUFACTURED— <i>Contd.</i> | | | | | |
| P. Leather and manufactures thereof | £ 13,067,141 | £ 14,072,966 | £ 16,760,949 | + 2,687,983 | + 1,693,808 |
| Q. Paper and cardboard | 13,090,333 | 13,717,099 | 16,430,793 | + 713,094 | + 1,340,460 |
| R. Vehicles (including locomotives, ships and aircraft) | 15,992,209 | 12,259,815 | 12,136,797 | — 123,018 | — 3,855,412 |
| S. Rubber manufactures | 2,529,710 | 2,770,326 | 2,592,326 | — 177,800 | + 62,816 |
| T. Miscellaneous articles, wholly or mainly manufactured | 28,827,420 | 27,348,183 | 30,318,801 | + 2,970,618 | + 1,101,381 |
| Total, Class III | 319,631,089 | 314,682,305 | 322,407,385 | + 7,725,080 | + 2,776,296 |
| IV. ANIMALS, NOT FOR FOOD | 2,306,662 | 2,154,784 | 2,678,016 | + 519,132 | + 367,254 |
| V. PARCEL POST, NON-DUTIABLE ARTICLES | 3,893,273 | 2,552,191 | 3,005,312 | — 433,121 | — 887,961 |
| Total | 1,320,713,190 | 1,241,361,277 | 1,219,387,421 | — 21,773,833 | — 101,327,766 |

Values (f.o.b.) of Exports of British and Irish Produce and Manufactures for the years 1925-26-27.*

(From the Monthly Trade Returns, December, 1927.)

| | Year ended December 31, | | | Increase (+) or Decrease (—) in 1927 as compared with 1926. | Increase (+) or Decrease (—) in 1927 as compared with 1925. |
|---|-------------------------|-------------|-------------|--|--|
| | 1925. | 1926. | 1927. | | |
| I. FOOD, DRINK AND TOBACCO— | | | | | |
| A. Grain and flour | £ 9,067,456 | £ 5,792,095 | £ 5,597,977 | — 194,118 | — 3,469,479 |
| B. Feeding-stuffs for animals | 3,070,571 | 2,389,970 | 2,955,391 | + 565,421 | — 115,180 |
| C. Meat | 1,726,529 | 1,640,812 | 1,689,343 | + 28,730 | — 56,987 |
| D. Animals, living, for food | 161,540 | 146,553 | 142,261 | — 4,292 | — 22,279 |
| E. and F. Other food and drink | 33,900,280 | 32,426,850 | 33,510,510 | + 1,083,860 | — 389,770 |
| G. Tobacco | 7,056,920 | 8,061,231 | 8,404,526 | + 343,295 | + 1,347,606 |
| Total, Class I | 54,989,296 | 50,137,311 | 52,280,207 | + 1,822,896 | — 2,706,089 |
| II. RAW MATERIALS AND ARTICLES MAINLY UNMANUFACTURED— | | | | | |
| A. Coal | 50,477,211 | 19,137,106 | 45,530,795 | + 26,393,689 | — 4,946,416 |
| B. Other non-metallic mining and quarry products and the like | 1,951,915 | 1,916,658 | 1,895,651 | — 21,001 | — 56,261 |
| C. Iron ore and scrap | 447,314 | 285,159 | 872,696 | + 587,537 | + 425,382 |
| D. Non-ferrous metalliferous ores and scrap | 1,329,191 | 1,577,913 | 1,949,905 | + 371,992 | + 620,711 |
| E. Wood and timber | 756,849 | 639,804 | 539,738 | — 100,066 | — 217,111 |
| F. Raw cotton and cotton waste | 1,786,222 | 1,041,126 | 1,217,901 | + 176,775 | — 515,321 |
| G. Wool, raw, and waste, and woollen rags | 11,503,471 | 8,453,290 | 10,171,191 | + 2,017,904 | — 1,032,277 |
| H. Silk, raw, knubs and nolls | 64,397 | 24,413 | 72,382 | + 47,969 | + 7,985 |
| I. Other textile materials | 546,207 | 292,291 | 233,730 | — 58,561 | — 312,477 |
| J. Oil seeds, nuts, oils, fats, resins and gums | 7,023,797 | 6,221,082 | 5,450,687 | — 770,395 | — 1,575,110 |
| K. Hides and skins, undressed | 2,880,382 | 2,395,541 | 2,585,672 | + 190,131 | — 294,710 |
| L. Paper-making materials | 1,866,933 | 1,324,933 | 1,867,363 | — 137,390 | — 499,370 |
| M. Rubber | 288,163 | 307,160 | 293,376 | — 13,884 | + 5,114 |
| N. Miscellaneous raw materials and articles mainly unmanufactured | 3,446,586 | 3,345,223 | 3,874,799 | + 529,574 | + 428,213 |
| Total, Class II | 84,350,637 | 47,162,351 | 76,355,792 | + 29,193,441 | — 7,994,845 |

* The value of the Exports represents the cost and the charges of delivering the goods on board the ship, and is known as the "free on board" value.

Values (*f.o.b.*) of Exports for the years 1925-26-27—Contd.

(From the Monthly Trade Returns, December, 1927.)

| | Year ended December 31, | | | Increase (+) or Decrease (—) in 1927 as compared with 1926. | Increase (+) or Decrease (—) in 1927 as compared with 1925. |
|---|-------------------------|-------------|-------------|--|--|
| | 1925. | 1926. | 1927. | | |
| III. ARTICLES WHOLLY OR MAINLY MANUFACTURED— | £ | £ | £ | £ | £ |
| A. Coke and manufactured fuel | 3,835,413 | 1,362,918 | 3,660,298 | + 2,297,375 | — 175,150 |
| B. Earthenware, glass, abrasives, &c. | 12,977,919 | 11,914,080 | 13,019,182 | + 1,105,102 | + 41,263 |
| C. Iron and steel and manufactures thereof | 67,856,004 | 55,060,975 | 69,129,233 | + 14,368,358 | + 1,573,229 |
| D. Non-ferrous metals and manufactures thereof | 16,837,415 | 19,469,027 | 19,578,511 | + 409,504 | + 3,041,126 |
| E. Cutlery, hardware, implements and instruments | 9,412,705 | 8,901,466 | 8,828,531 | + 27,069 | — 584,171 |
| F. Electrical goods and apparatus | 11,606,599 | 13,365,891 | 11,880,571 | — 1,485,020 | + 271,275 |
| G. Machinery | 49,163,015 | 43,686,987 | 49,943,569 | + 6,256,582 | + 780,524 |
| H. Manufactures of wood and timber | 2,296,291 | 2,123,310 | 2,316,957 | + 193,647 | + 20,666 |
| I. Cotton yarns and manufactures | 199,407,913 | 131,310,912 | 118,780,117 | — 5,680,795 | — 50,627,796 |
| J. Woollen and worsted yarns and manufactures | 55,934,216 | 51,312,673 | 56,751,298 | + 5,438,625 | — 2,182,918 |
| K. Silk and silk manufactures | 1,842,069 | 1,953,498 | 2,427,973 | + 474,475 | + 585,904 |
| L. Manufactures of other textile materials | 27,888,426 | 26,744,362 | 27,062,227 | + 317,865 | — 826,169 |
| M. Apparel | 28,922,390 | 27,313,669 | 25,513,069 | — 1,800,600 | — 3,109,321 |
| N. Chemicals, drugs, dyes and colours | 23,625,202 | 21,659,716 | 23,438,225 | + 1,778,509 | — 196,967 |
| O. Oils, fats and resins, manufactured | 10,226,990 | 9,447,081 | 9,095,083 | — 351,998 | — 1,131,316 |
| P. Leather and manufactures thereof | 7,067,897 | 6,676,882 | 8,344,634 | + 1,667,752 | + 1,276,737 |
| Q. Paper and cardboard | 9,816,381 | 9,789,853 | 9,131,091 | — 658,262 | — 682,293 |
| R. Vehicles (including locomotives, ships and aircraft) | 36,910,415 | 35,106,563 | 35,422,240 | + 315,676 | — 1,488,166 |
| S. Rubber manufactures | 3,536,671 | 3,422,372 | 3,297,911 | — 124,461 | — 238,757 |
| T. Miscellaneous articles wholly or mainly manufactured | 34,444,005 | 33,789,253 | 35,439,795 | + 1,650,540 | + 995,790 |
| Total, Class III | 616,608,038 | 539,310,935 | 563,964,508 | + 24,623,573 | — 52,643,530 |
| IV. ANIMALS, NOT FOR FOOD | 2,293,157 | 1,716,720 | 1,897,353 | + 180,633 | — 396,104 |
| V. PARTLY POST | 15,142,274 | 14,369,592 | 14,607,512 | + 237,920 | — 534,732 |
| Total | 773,380,702 | 653,046,909 | 709,101,102 | + 56,058,193 | — 64,275,300 |

FOREIGN EXCHANGES.—Quotations as under, LONDON on Paris, Berlin and Calcutta; New York and Hong Kong on LONDON, 1927.

| Date (Wednesdays.) | 1 | 2 | 3 | 4 | 5 | 6 7 | |
|-----------------------|-----------------------------|-----------------------------|-----------------------------|------------------------------|----------------------------|----------------------|---------------------------------------|
| | London on Paris. | London on Berlin. | London on Calcutta. | New York on London. | Hong Kong on London. | Price per Ounce. | |
| | Cables (middle rate). | Cables (middle rate). | Demand (middle rate). | Cables (closing rate). | T.T. | Gold Bars (fine). | Silver Standard Bars (cash). |
| 1927. | <i>f. s.</i> | <i>Reich- mark</i> . | <i>s. d.</i> | <i>s. s.</i> | <i>s. d.</i> | <i>s. d.</i> | <i>s. d.</i> |
| Jan 5..... | 123-00 | 20-43½ | 1-6½ | 4-85 | 1-11½ | 84-11½ | 2-0½ |
| „ 19..... | 122-27½ | 20-46½ | 1-6 | 4-85 | 2-0½ | 84-10½ | 2-1¼ |
| Feb. 2..... | 123-25 | 20-47 | 1-6 | 4-85 | Holiday 2 0 | 84-11½ | 2-3½ |
| „ 16..... | 123-65 | 20-47 | 1-6½ | 4-85 | | 84-10½ | 2-2½ |
| Mar 2..... | 124-00 | 20-47 | 1-5½ | 4-85 | 2 0 | 84-11½ | 2-2½ |
| „ 16..... | 124-00 | 20-45 | 1-6 | 4-85 | 1-11½ | 84-11½ | 2-1½ |
| „ 30..... | 124-00 | 20-48 | 1-5½ | 4-85 | 1-11½ | 84-11½ | 2-2½ |
| Apr. 13..... | 124-01 | 20-48½ | 1-5½ | 4-85 | 2-0½ | 84-11½ | 2-2 |
| „ 27..... | 124-00 | 20-49 | 1-5½ | 4-85 | 2 0½ | 84-11½ | 2-1½ |
| May 11..... | 124-00 | 20-51 | 1-5½ | 4-85 | 2-0½ | 84-11½ | 2-1½ |
| „ 25..... | 124-00 | 20-50 | 1-6 | 4-85 | 1-11½ | 84-11½ | 2-2½ |
| June 8..... | 124-00 | 20-50 | 1-5½ | 4-85 | 2-0 | 84-11½ | 2-2½ |
| „ 22..... | 124-00 | 20-49 | 1-5½ | 4-85 | 1-11½ | 84-11½ | 2-2½ |
| July 6..... | 124-00 | 20-49 | 1-5½ | 4-85 | 1-11½ | 84-11½ | 2-1½ |
| „ 20..... | 124-00 | 20-42½ | 1-5½ | 4-85 | 1-11½ | 84-11 | 2-2½ |
| Aug. 3..... | 124-05 | 20-41 | 1-5½ | 4-85 | 1-11½ | 84-10½ | 2-1½ |
| „ 17..... | 124-00 | 20-44 | 1-5½ | 4-86 | 1-11½ | 84-10½ | 2-1½ |
| „ 31..... | 124-00 | 20-43 | 1-5½ | 4-86 | 1-11½ | 84-10½ | 2-1½ |
| Sept 14..... | 124-00 | 20-44 | 1-6 | 4-86 | 1-11½ | 84-11½ | 2-1½ |
| „ 28..... | 124-00 | 20-44 | 1-6 | 4-86 | 1-11½ | 84-10½ | 2-1½ |
| Oct 12..... | 124-00 | 20-42 | 1-5½ | Holiday 4-86 | 2-0½ | 84-11½ | 2-1½ |
| „ 26..... | 124-05 | 20-40½ | 1-6 | | 1-11½ | 84-11 | 2-1½ |
| Nov. 9..... | 124-05 | 20-42 | 1-6 | 4-87 | 2-0½ | 84-11½ | 2-2½ |
| „ 23..... | 124-00 | 20-42 | 1-6 | 4-87 | 2-0½ | 84-11½ | 2-2½ |
| Dec 7..... | 124-00 | 20-44 | 1-6 | 4-88 | 2-0½ | 84-11½ | 2-2½ |
| „ 21..... | 124-00 | 20-43 | 1-6½ | 4-88 | 2-0½ | 84-10 | 2-2½ |

BANK OF ENGLAND.
Pursuant to the Act 7th and 8th Victoria, cap. 32 (1844),
(000's omitted.)

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|-------------------|-------------------------|---------------------|----------------------|------------------------------|---|---|
| ISSUE DEPARTMENT. | | | | | COLLATERAL COLUMNS. | |
| Liabilities. | DATES. (Wednesdays.) | Assets. | | | Notes in hands of Public. (Col. 1 minus col. 16.) | Minimum Discount Rates at Bank of England. |
| Notes Issued. | | Government Debt. | Other Securities. | Gold Coin and Bullion. | | |
| £ | 1927. | £ | £ | £ | £ | Per cent. 5 |
| 169,996 | Jan. 5..... | 11,015 | 8,735 | 150,116 | 139,803 | |
| 170,007 | " 12..... | 11,015 | 8,735 | 150,357 | 138,084 | |
| 169,955 | " 19..... | 11,015 | 8,735 | 150,235 | 137,100 | |
| 169,931 | " 26..... | 11,015 | 8,735 | 150,081 | 137,049 | |
| 169,502 | Feb. 2..... | 11,015 | 8,735 | 149,752 | 137,937 | |
| 168,694 | " 9..... | 11,015 | 8,735 | 148,913 | 136,970 | |
| 168,628 | " 16..... | 11,015 | 8,735 | 148,878 | 136,188 | |
| 168,581 | " 23..... | 11,015 | 8,735 | 148,831 | 136,604 | |
| 168,522 | Mar. 2..... | 11,015 | 8,735 | 148,772 | 137,589 | |
| 169,106 | " 9..... | 11,015 | 8,735 | 149,856 | 137,057 | |
| 169,050 | " 16..... | 11,015 | 8,735 | 149,800 | 136,706 | |
| 169,012 | " 23..... | 11,015 | 8,735 | 149,262 | 136,254 | |
| 168,834 | " 30..... | 11,015 | 8,735 | 149,084 | 137,952 | |
| 169,562 | Apr. 6..... | 11,015 | 8,735 | 149,812 | 137,839 | |
| 171,834 | " 13..... | 11,015 | 8,735 | 151,554 | 137,860 | |
| 171,994 | " 20..... | 11,015 | 8,735 | 152,244 | 137,038 | |
| 172,202 | " 27..... | 11,015 | 8,735 | 152,512 | 137,515 | 4½ |
| 171,686 | May 4..... | 11,015 | 8,735 | 151,986 | 137,585 | |
| 172,050 | " 11..... | 11,015 | 8,735 | 152,300 | 136,170 | |
| 173,519 | " 18..... | 11,015 | 8,735 | 153,769 | 135,493 | |
| 170,628 | " 25..... | 11,015 | 8,735 | 150,878 | 135,859 | |
| 170,690 | June 1..... | 11,015 | 8,735 | 150,910 | 136,346 | |
| 170,236 | " 8..... | 11,015 | 8,735 | 150,186 | 137,333 | |
| 170,232 | " 15..... | 11,015 | 8,735 | 150,602 | 136,500 | |
| 170,166 | " 22..... | 11,015 | 8,735 | 150,406 | 136,297 | |
| 170,246 | " 29..... | 11,015 | 8,735 | 150,496 | 137,977 | |
| 169,244 | July 6..... | 11,015 | 8,735 | 149,411 | 138,258 | |
| 169,213 | " 13..... | 11,015 | 8,735 | 149,193 | 137,585 | |
| 169,973 | " 20..... | 11,015 | 8,735 | 150,223 | 137,361 | |
| 169,972 | " 27..... | 11,015 | 8,735 | 150,222 | 137,958 | |
| 170,405 | Aug. 3..... | 11,015 | 8,735 | 150,655 | 137,312 | |
| 170,878 | " 10..... | 11,015 | 8,735 | 151,128 | 137,492 | |
| 170,108 | " 17..... | 11,015 | 8,735 | 150,358 | 136,837 | |
| 169,683 | " 24..... | 11,015 | 8,735 | 149,983 | 136,430 | |
| 169,436 | " 31..... | 11,015 | 8,735 | 149,686 | 136,449 | |
| 170,081 | Sept. 7..... | 11,015 | 8,735 | 150,331 | 136,026 | |
| 169,248 | " 14..... | 11,015 | 8,735 | 149,495 | 136,102 | |
| 168,629 | " 21..... | 11,015 | 8,735 | 148,879 | 135,629 | |
| 169,245 | " 28..... | 11,015 | 8,735 | 149,495 | 136,505 | |
| 169,364 | Oct. 5..... | 11,015 | 8,735 | 149,614 | 136,989 | |
| 169,193 | " 12..... | 11,015 | 8,735 | 149,443 | 136,272 | |
| 169,422 | " 19..... | 11,015 | 8,735 | 149,672 | 135,539 | |
| 170,037 | " 26..... | 11,015 | 8,735 | 150,287 | 135,773 | |
| 169,188 | Nov. 2..... | 11,015 | 8,735 | 149,738 | 136,576 | |
| 169,014 | " 9..... | 11,015 | 8,735 | 150,164 | 135,929 | |
| 169,566 | " 16..... | 11,015 | 8,735 | 150,116 | 135,207 | |
| 169,867 | " 23..... | 11,015 | 8,735 | 150,117 | 135,214 | |
| 168,313 | " 30..... | 11,015 | 8,735 | 148,593 | 136,904 | |
| 168,236 | Dec. 7..... | 11,015 | 8,735 | 148,486 | 136,805 | |
| 168,515 | " 14..... | 11,015 | 8,735 | 148,795 | 137,249 | |
| 169,132 | " 21..... | 11,015 | 8,735 | 149,402 | 138,779 | |
| 171,218 | " 28..... | 11,015 | 8,735 | 151,468 | 138,711 | |

WEEKLY RETURN.

for Wednesday in each Week, during the Year 1927.

(000's omitted.)

| 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
|---------------------|-------|-----------|----------|--|-----------------------------|------------------|---------|----------|-----------------------------|--|
| BANKING DEPARTMENT. | | | | | | | | | | |
| Liabilities. | | | | | DATE. (Wednes- days.) | Assets. | | | | Totals of Liabili- ties and Assets. |
| Capital and Rest. | | Deposits. | | Seven Day and other Bills. | | Securities. | | Reserve. | | |
| Capital. | Rest. | Public. | Private. | | | Govern- ment. | Other. | Notes. | Gold and silver Coin. | |
| | | | | | | | | | | |
| £ | £ | £ | £ | £ | 1927. | £ | £ | £ | £ | £ |
| 14,553 | 3,188 | 11,527 | 111,057 | 3 | Jan. 5..... | 36,098 | 103,203 | 30,092 | 1,235 | 170,628 |
| 14,553 | 3,512 | 15,372 | 111,539 | 3 | " 12..... | 34,768 | 77,056 | 31,923 | 1,232 | 144,979 |
| 14,553 | 3,542 | 12,052 | 111,749 | 4 | " 19..... | 31,822 | 75,877 | 32,885 | 1,256 | 141,900 |
| 14,553 | 3,546 | 13,734 | 102,777 | 4 | " 26..... | 25,118 | 72,453 | 32,762 | 1,263 | 134,616 |
| 14,553 | 3,601 | 9,537 | 108,190 | 3 | Feb. 2..... | 28,876 | 74,163 | 31,565 | 1,280 | 135,884 |
| 14,553 | 3,609 | 14,720 | 105,635 | 3 | " 9..... | 29,573 | 75,668 | 31,723 | 1,246 | 138,510 |
| 14,553 | 3,635 | 17,508 | 102,282 | 2 | " 16..... | 29,813 | 74,429 | 32,110 | 1,298 | 137,980 |
| 14,553 | 3,611 | 17,834 | 98,476 | 4 | " 23..... | 29,065 | 71,251 | 31,977 | 1,317 | 134,510 |
| 14,553 | 3,725 | 9,643 | 109,530 | 5 | Mar. 2..... | 32,268 | 72,912 | 30,933 | 1,343 | 137,456 |
| 14,553 | 3,721 | 16,159 | 103,922 | 4 | " 9..... | 31,223 | 73,690 | 32,019 | 1,397 | 136,359 |
| 14,553 | 3,742 | 19,184 | 102,179 | 10 | " 16..... | 32,657 | 73,231 | 32,314 | 1,436 | 139,668 |
| 14,553 | 3,707 | 17,396 | 104,031 | 4 | " 23..... | 30,798 | 74,733 | 32,757 | 1,463 | 139,751 |
| 14,553 | 3,734 | 32,981 | 97,466 | 4 | " 30..... | 32,668 | 83,724 | 30,882 | 1,464 | 141,738 |
| 14,553 | 3,098 | 21,036 | 108,240 | 3 | Apr. 6..... | 30,982 | 77,766 | 31,708 | 1,488 | 141,939 |
| 14,553 | 3,098 | 23,901 | 97,076 | 6 | " 13..... | 26,982 | 74,588 | 33,474 | 1,590 | 138,634 |
| 14,553 | 3,153 | 15,244 | 110,384 | 7 | " 20..... | 37,956 | 68,779 | 31,956 | 1,601 | 141,293 |
| 14,553 | 3,117 | 10,170 | 95,647 | 6 | " 27..... | 47,941 | 62,156 | 34,717 | 1,651 | 126,493 |
| 14,553 | 3,172 | 12,398 | 98,830 | 6 | May 4..... | 46,289 | 41,903 | 34,101 | 1,606 | 123,950 |
| 14,553 | 3,174 | 12,758 | 102,094 | 4 | " 11..... | 47,824 | 47,220 | 35,881 | 1,658 | 132,583 |
| 14,553 | 3,198 | 15,685 | 100,247 | 3 | " 18..... | 47,349 | 46,762 | 38,026 | 1,619 | 133,686 |
| 14,553 | 3,198 | 19,759 | 98,336 | 4 | " 25..... | 46,519 | 50,919 | 34,700 | 1,663 | 135,870 |
| 14,553 | 3,224 | 14,724 | 111,402 | 3 | June 1..... | 50,606 | 57,320 | 34,344 | 1,636 | 143,906 |
| 14,553 | 3,225 | 12,550 | 109,889 | 3 | " 8..... | 52,566 | 45,606 | 32,903 | 1,625 | 132,720 |
| 14,553 | 3,317 | 19,113 | 97,923 | 3 | " 15..... | 50,386 | 49,162 | 33,752 | 1,609 | 134,909 |
| 14,553 | 3,337 | 20,168 | 95,289 | 2 | " 22..... | 49,111 | 48,477 | 33,538 | 1,603 | 133,340 |
| 14,553 | 3,398 | 7,875 | 119,033 | 3 | " 29..... | 51,666 | 59,395 | 32,260 | 1,622 | 144,862 |
| 14,553 | 3,461 | 19,205 | 101,377 | 3 | July 6..... | 17,517 | 61,488 | 30,956 | 1,581 | 141,662 |
| 14,553 | 3,499 | 10,033 | 100,425 | 3 | " 13..... | 18,917 | 46,362 | 31,658 | 1,476 | 128,513 |
| 14,553 | 3,510 | 12,630 | 101,979 | 3 | " 20..... | 49,867 | 48,610 | 32,612 | 1,566 | 132,075 |
| 14,553 | 3,530 | 9,878 | 103,182 | 3 | " 27..... | 49,999 | 47,858 | 32,011 | 1,562 | 131,116 |
| 14,553 | 3,577 | 9,522 | 102,840 | 3 | Aug. 3..... | 52,077 | 44,741 | 32,063 | 1,611 | 130,495 |
| 14,553 | 3,573 | 11,790 | 101,611 | 3 | " 10..... | 47,112 | 49,100 | 33,885 | 1,572 | 131,560 |
| 14,553 | 3,597 | 17,794 | 100,156 | 5 | " 17..... | 19,957 | 51,588 | 33,571 | 1,591 | 136,407 |
| 14,553 | 3,657 | 17,424 | 102,738 | 3 | " 24..... | 55,129 | 48,141 | 33,563 | 1,550 | 138,175 |
| 14,553 | 3,721 | 22,149 | 98,200 | 3 | " 31..... | 58,117 | 41,639 | 31,987 | 1,553 | 133,626 |
| 14,553 | 3,704 | 21,178 | 91,715 | 4 | Sept. 7..... | 57,438 | 42,142 | 33,051 | 1,550 | 134,184 |
| 14,553 | 3,727 | 11,730 | 100,112 | 3 | " 14..... | 51,254 | 44,164 | 33,116 | 1,561 | 130,125 |
| 14,553 | 3,772 | 21,894 | 100,644 | 4 | " 21..... | 56,190 | 49,799 | 33,000 | 1,577 | 140,567 |
| 14,553 | 3,792 | 25,696 | 97,538 | 3 | " 28..... | 56,310 | 50,935 | 32,739 | 1,598 | 141,582 |
| 14,553 | 3,098 | 20,993 | 109,864 | 4 | Oct. 5..... | 57,845 | 56,728 | 32,871 | 1,565 | 148,512 |
| 14,553 | 3,084 | 22,830 | 101,503 | 3 | " 12..... | 52,930 | 53,560 | 32,921 | 1,564 | 140,975 |
| 14,553 | 3,119 | 22,097 | 99,381 | 2 | " 19..... | 47,550 | 56,177 | 33,853 | 1,542 | 139,153 |
| 14,553 | 3,109 | 20,966 | 90,546 | 3 | " 26..... | 40,680 | 52,998 | 34,264 | 1,524 | 129,476 |
| 14,553 | 3,152 | 21,346 | 100,651 | 3 | Nov. 2..... | 44,610 | 60,673 | 32,012 | 1,313 | 139,708 |
| 14,553 | 3,187 | 18,413 | 95,167 | 2 | " 9..... | 41,310 | 54,854 | 33,985 | 1,478 | 131,622 |
| 14,553 | 3,330 | 16,599 | 98,713 | 2 | " 16..... | 41,385 | 55,621 | 34,039 | 1,482 | 133,097 |
| 14,553 | 3,239 | 16,761 | 97,772 | 3 | " 23..... | 40,895 | 55,407 | 34,053 | 1,373 | 132,328 |
| 14,553 | 3,254 | 18,372 | 95,162 | 3 | " 30..... | 41,275 | 57,355 | 31,439 | 1,325 | 135,394 |
| 14,553 | 3,292 | 7,434 | 109,228 | 3 | Dec. 7..... | 47,386 | 55,069 | 31,431 | 1,224 | 135,110 |
| 14,553 | 3,315 | 8,721 | 101,811 | 3 | " 14..... | 41,309 | 54,714 | 31,296 | 1,111 | 128,163 |
| 14,553 | 3,368 | 18,445 | 102,902 | 3 | " 21..... | 42,984 | 64,955 | 30,373 | 979 | 139,291 |
| 14,553 | 3,383 | 14,562 | 123,975 | 2 | " 28..... | 48,679 | 74,449 | 32,507 | 940 | 156,475 |

JOURNAL
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THE POST-WAR DEPRESSION IN THE LANCASHIRE COTTON
INDUSTRY.

By PROFESSOR G. W. DANIELS and J. JEWKES.*

[Read before the Royal Statistical Society, January 17, 1928, the RT. HON. SIR
HERBERT SAMUEL, G.C.B., G.B.E., Hon. Vice-President, in the Chair.]

SECTION 1.—PRODUCTION AND EXPORTS.

A.—The Physical Volume of Production and Exports.

THE aim of this paper is simply to throw a little light on the depression which has prevailed in the Lancashire cotton industry since 1920. Other papers, with a similar aim, have been presented elsewhere, † and in this introductory section we propose to summarise some of the figures and results contained therein, in order that what follows in this paper may be seen in a clearer light.

Our first set of figures aims at showing the extent of the depression as it is reflected in estimates of the production of yarn and in the exports of piece-goods and yarn.

From Table I it will be seen that the average production of yarn in the years 1923–26 was about 70 per cent. of the 1913 production; and that the exports of piece-goods and yarn were, respectively, 62 per cent. and 79 per cent. of the 1913 exports.

* In the collection and preparation of the material contained in this paper our colleagues, Professor Clay, Miss F. Collier, and Mr. H. Campion, have rendered so much assistance that they ought to be regarded as equally responsible with us for its production.

† The principal paper is one on *The Comparative Position of the Lancashire Cotton Industry and Trade* read before the Manchester Statistical Society, January, 1927.

TABLE I.

*United Kingdom.**Estimated Production of Yarn * ; Exports of Cotton Piece-Goods ; Exports of Yarn.*

| Year. | Production of yarn. | | Exports of piece-goods in linear yards. | Exports of yarn in lbs. |
|-------------|------------------------|-------------|---|----------------------------|
| | In millions of lbs. | 1913 = 100. | 1913 = 100. | 1913 = 100. |
| 1913 | 1922 | 100 | 100 | 100 |
| 1920 | 1512 | 79 | 65 | 70 |
| 1921 | 971 | 51 | 43 | 69 |
| 1922 | 1368 | 71 | 61 | 96 |
| 1923 | 1230 | 64 | 61 | 69 |
| 1924 | 1352 | 70 | 65 | 78 |
| 1925 | 1492 | 78 | 66 | 90 |
| 1926 | 1296 | 67 | 56 | 80 |

* The method of estimation is explained in the paper mentioned in the second footnote on p. 153.

Here, however, we would emphasize that the figures contained in the table relate to quantities and, following the lead of Mr. A. W. Flux,* would point out that figures of quantity, without regard to quality, may give an erroneous impression of the real importance of any decline or increase. The significance of this consideration is seen in the fact that, whereas for 1922-24 exports of piece-goods in yards were 62 per cent. of the 1913 yardage, the value of these exports, at 1913 prices, was 72 per cent. of the 1913 value. Partly, this grading up of the average quality of the exports is due to the greatest decline of exports having taken place in the cheaper kinds of goods, but it is also partly due to an upward change in the quality of the goods demanded. Whether there has been a similar change in the quality of the goods supplied to the home market it is impossible to determine, but there are certain reasons (*e.g.* changes of fashion) for thinking that such has been the case.

B.—World-Trade in Cotton Piece-Goods and Yarn.

When we bear in mind that only a small percentage of the cotton yarn produced in Lancashire is exported (according to a preliminary report of the recent Census of Production the percentage was 11.8 in 1924 †), and that yarn exports have been fairly well maintained, it becomes evident that an explanation of the present depression has to be sought in a decline of demand for piece-goods.

* *Economic Journal*, December, 1926.

† *Board of Trade Journal*, March 3, 1927.

Again, seeing that Lancashire piece-goods find their way to every market of the world, the present state of world-trade in piece-goods becomes important.

In this connection the following tables compiled for the Geneva Economic Conference, 1927, and presented in the "Memorandum on Cotton," supply valuable information.

TABLE II.
Exports of Yarn.
(Metric tons.)

| | Av. 1909-13. | %. | Av. 1923-25. | %. | % 1923-25 of 1909-13. |
|-------------------------------------|--------------|------|--------------|------|--------------------------|
| United Kingdom ... | 98,397 | 33·6 | 75,237 | 33·4 | 76·5 |
| Italy | 13,149 | 4·5 | 15,219 | 6·8 | 115·7 |
| Germany | 14,356 | 4·9 | 6,478 | 2·9 | 45·1 |
| Czechoslovakia ... | — | — | 19,482 | 8·7 | — |
| Belgium | 5,558 | 1·9 | 8,996 | 4·0 | 161·9 |
| France | 8,444*† | 2·9 | 11,536 † | 5·1 | 136·6 |
| India | 89,924 | 30·7 | 16,967 | 7·5 | 18·9 |
| Japan | 51,497 † | 17·5 | 49,770 | 22·1 | 96·6 |
| Other principal countries | 11,872 | 4·0 | 21,334 | 9·5 | 179·7 |
| Total | 293,197 | 100 | 225,019 | 100 | 76·7 |

* 1913 only.

† The average in this case is for 1909-11.

‡ Includes thread.

TABLE III.
Exports of Piece-Goods.
(Metric tons.)

| | Av. 1909-13. | %. | Av. 1923-25. | %. | % 1923-25 of 1909-13. |
|-------------------------------------|--------------|------|--------------|------|--------------------------|
| United Kingdom ... | 536,837 | 69·9 | 369,111 | 50·5 | 68·8 |
| United States of America | 33,465 | 4·4 | 42,588 | 5·8 | 127·3 |
| Italy | 42,910 | 5·6 | 58,350 | 8·0 | 136·0 |
| France | 44,324* | 5·8 | 45,374 | 6·2 | 102·4 |
| Japan | 10,336† | 1·3 | 84,188 | 11·5 | 814·5 |
| Czechoslovakia ... | — | — | 31,082 | 4·2 | — |
| India | 12,728 | 1·7 | 18,674 | 2·6 | 146·7 |
| Other principal countries | 87,103 | 11·3 | 81,348 | 11·2 | 93·4 |
| Total | 767,703 | 100 | 730,715 | 100 | 95·2 |

* 1913 only.

† The average in this case is for 1909-11. This affects the comparison, as the exports of piece-goods were increasing before the war.

On these tables little comment is required. Comparing the later series of years with the earlier, world-trade in yarn was down by 23 per cent., the trade of the United Kingdom and India showing the greatest decline. Of the smaller amount of trade, however, the United Kingdom maintained the same proportion as of the larger, while the position of India has to be viewed in the light of the facts that, during the period, her exports of piece-goods increased by 47 per cent. and that between 1910-14 and 1922-26 her average annual mill-production of piece-goods increased from 1,015 million yards to 1,653 million yards, an increase of 62 per cent.

Turning to the world-trade in piece-goods we see that between the two series of years this trade declined by 5 per cent., but that, whereas in the earlier years the United Kingdom supplied 70 per cent. in the later years she supplied only 50.5 per cent. It follows, therefore, that the trade of the United Kingdom in piece-goods has declined both absolutely and relatively, and that the decline must almost completely have been made up from other sources.

C.—Analysis of Markets and Incidence of the Depression.

The next tables show the groups of markets in which the trade of the United Kingdom has been lost and the extent of the loss. As may be seen at a glance, the greatest loss has been in those groups which absorb the largest quantities of piece-goods, and of these the Far Eastern group is pre-eminent both as regards size and the extent to which its demand has declined. Comparing 1913 with 1926 total exports declined by 3,152 million yards, the decline to India accounting for 1,597 million yards. In 1913 India took 70 per cent. of the total yardage sent to the Far East, China, the next largest market, taking less than 17 per cent.

TABLE IV.
Piece-Goods Exports from United Kingdom.
(Linear yards.)
(1920-26 as percentage of 1913.)

| Groups or markets. | 1913. | 1920. | 1921. | 1922. | 1923. | 1924. | 1925. | 1926. |
|---------------------------------|------------|-------|-------|-------|-------|-------|-------|-------|
| | (000 yds.) | | | | | | | |
| Far East ... | 4,357,711 | 51 | 31 | 45 | 44 | 50 | 44 | 44 |
| Near East ... | 721,420 | 101 | 76 | 78 | 82 | 78 | 91 | 50 |
| South America | 672,864 | 78 | 33 | 54 | 76 | 70 | 83 | 63 |
| Self-governing Dominions ... | 393,220 | 74 | 53 | 101 | 82 | 76 | 81 | 85 |
| Europe ... | 369,774 | 102 | 46 | 149 | 89 | 119 | 130 | 88 |
| Africa ... | 333,243 | 81 | 53 | 71 | 80 | 84 | 105 | 83 |
| United States... | 44,415 | 230 | 126 | 218 | 387 | 360 | 199 | 115 |

TABLE V.
Percentage Distribution of Piece-Goods Exports from United Kingdom.

| Groups of markets. | 1913. | 1920. | 1921. | 1922. | 1923. | 1921. | 1925. | 1926. |
|--------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|
| Far East ... | 61.6 | 47.8 | 48.0 | 45.6 | 44.2 | 47.5 | 41.8 | 49.4 |
| Near East ... | 10.2 | 15.8 | 18.1 | 13.1 | 13.7 | 12.8 | 14.3 | 9.2 |
| South America ... | 9.5 | 11.4 | 7.3 | 8.4 | 11.8 | 10.6 | 12.5 | 10.8 |
| Self-governing Dominions ... | 5.6 | 6.3 | 6.9 | 9.2 | 8.0 | 6.6 | 6.8 | 8.5 |
| Europe ... | 5.2 | 8.2 | 5.6 | 12.7 | 7.6 | 9.6 | 10.3 | 8.3 |
| Africa ... | 4.8 | 6.1 | 6.0 | 5.9 | 6.4 | 6.1 | 7.9 | 7.0 |
| United States ... | 0.6 | 2.2 | 1.8 | 2.2 | 4.0 | 3.4 | 1.9 | 1.3 |
| Others ... | 2.5 | 2.2 | 6.3 | 2.9 | 4.3 | 3.4 | 4.5 | 5.5 |
| All ... | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Total in million linear yards ... | 7,075 | 4,613 | 3,038 | 4,313 | 4,324 | 4,585 | 4,637 | 3,923 |

The last point we wish to make in this section is that the incidence of the decline has fallen with greatest weight on the cheaper classes of piece-goods, as may be seen from the following table :

TABLE VI.
Classification of 53 Important Export Markets according to Value per 1,000 Yds. of Exports in 1913, Showing Percentage Decline in each Group.

| Group of markets with 1913 value per 1,000 yds. | Total exports of cotton piece-goods in linear yardage to each group. (1913 = 100.) | |
|--|---|----------|
| | 1913. | 1922-24. |
| Up to £14 ... | 100 | 50 |
| £14 to £17 ... | 100 | 56 |
| £17 and above ... | 100 | 114 |

Such being the incidence it is evident that the depression in the cotton industry will be found mainly among those concerns—spinning and weaving—which are engaged in producing the cheaper qualities of yarn and piece-goods. On the spinning side this means those engaged on the lower and medium counts, the American section, whose spindles comprise about two-thirds of the total spindles of the industry. Even the fact that exports of yarn have declined to a less extent than exports of piece-goods has been of little benefit to these spinners, for, as the following figures show, the tendency has been for the higher counts of yarn to form a larger proportion of the total exports.

TABLE VII.
Percentage Distribution of Yarn Exports from United Kingdom by Counts.

Percentages based upon Weight.

| Counts. | 1920. | 1921. | 1922. | 1923. | 1924. | 1925. | 1926. |
|-----------------------|-------|-------|-------|-------|-------|-------|-------|
| 40's and under | 64 | 60 | 60 | 52 | 47 | 51 | 53 |
| 40's-80's | 25 | 31 | 30 | 35 | 38 | 35 | 35 |
| 80's-120's | 9 | 8 | 8 | 12 | 14 | 12 | 11 |
| 120's and over | 2 | 1 | 1 | 1 | 1 | 1 | 1 |
| | 100 | 100 | 100 | 100 | 100 | 100 | 100 |

Annual Returns of Board of Trade. This classification not adopted until 1920.

What we should expect, therefore, is a marked difference between the American section and the Egyptian section, the fine section of the industry, and with this introduction we may now proceed to the next section of the paper in which we consider the effect of the depression upon the state of employment in spinning and weaving.

SECTION 2.—ANALYSIS OF UNEMPLOYMENT, 1920-27.

A.—The Difficulties of Constructing an Index.

There is no wholly satisfactory method of tracing the course of employment in the cotton industry and in different sections of the industry since 1920. All the figures of employment or unemployment are open to suspicion for a twofold reason. Much of the unemployment is experienced in the form of short-time—the working of less than a full week. Thus the danger arises that figures taken on a particular day, or indeed in any manner other than the collection of the average number of man-days lost per week, may be hopelessly wrong. A second and even greater difficulty is the under-employment which arises when an operative works less than his full complement of machinery—thus in slack times a weaver may work only two instead of his normal four looms. Industrial activity can then, perhaps, only be accurately measured by an index of machine activity, and this index, though conceivably possible, does not exist.

The only information which covers the period, and provides the necessary classification of different sections of the industry, is that published monthly in the *Ministry of Labour Gazette*, which is based upon voluntary information supplied by a sample of employers in the industry. The monthly figures also show the

percentage increase or decrease on the numbers for the previous month, so that it is possible to construct an index, taking any one month as basis, for the whole of the period in which the monthly figures remain unbroken. Certain weaknesses in the index are inevitable, since the total number of firms contributing to the sample, and the number of workers covered, change from time to time. Moreover, so far as we know, the figures do not take any account of short-time, or of the under-employment of machinery, and we have found it impossible to make allowance for these factors by the method adopted by Mr. Wood in a paper, read recently before this Society, dealing with the woollen industry. Again, the sample provided by the figures available for the cotton industry is only 13 per cent., and the sample is not ideally spread over the different sections of the industry, or the geographical areas of Lancashire. These limitations are considered in Appendix I.

We are convinced, however, that the index, with all its deficiencies, can be relied upon to give a fairly accurate idea of the broad movements of employment in the industry and in different sections of it. Wherever it has been possible to collect other information concerning industrial activity in local areas, or in the industry as a whole, we have found that the index shows movements very similar to those revealed by this information. The following sources have been used to test the index :—

1. Monthly figures of percentage time lost—including short-time working—by Bolton spinners, 1921–27.

2. Percentage of members of Oldham Operative Cotton Spinners' Associations "on the funds"—i.e. out of work or in receipt of temporary stoppage pay—in each month, 1921–27.

3. Percentage of total looms running in Blackburn on the last Saturday of each month, 1921–27.

4. Percentage of unemployment among insured persons in the cotton industry—*Ministry of Labour Gazette*, January 1926 to October 1927.

The above series are given along with the Index series in Appendix I.

B.—*The Course of General Employment.*

The basis month for our index is July 1921. The curves in Charts I and II for general employment and for employment in the spinning and in the weaving areas all show the same general movements as those revealed by the figures for exports of piece-goods. There was apparently a peak in employment and exports in the middle of 1922. From 1922 to 1926 the employment curves show comparative stability though there was a temporary decline

CHART I.

Monthly Exports. Piece-Goods from U.K. and Employment in Cotton Industry. 1920-27.

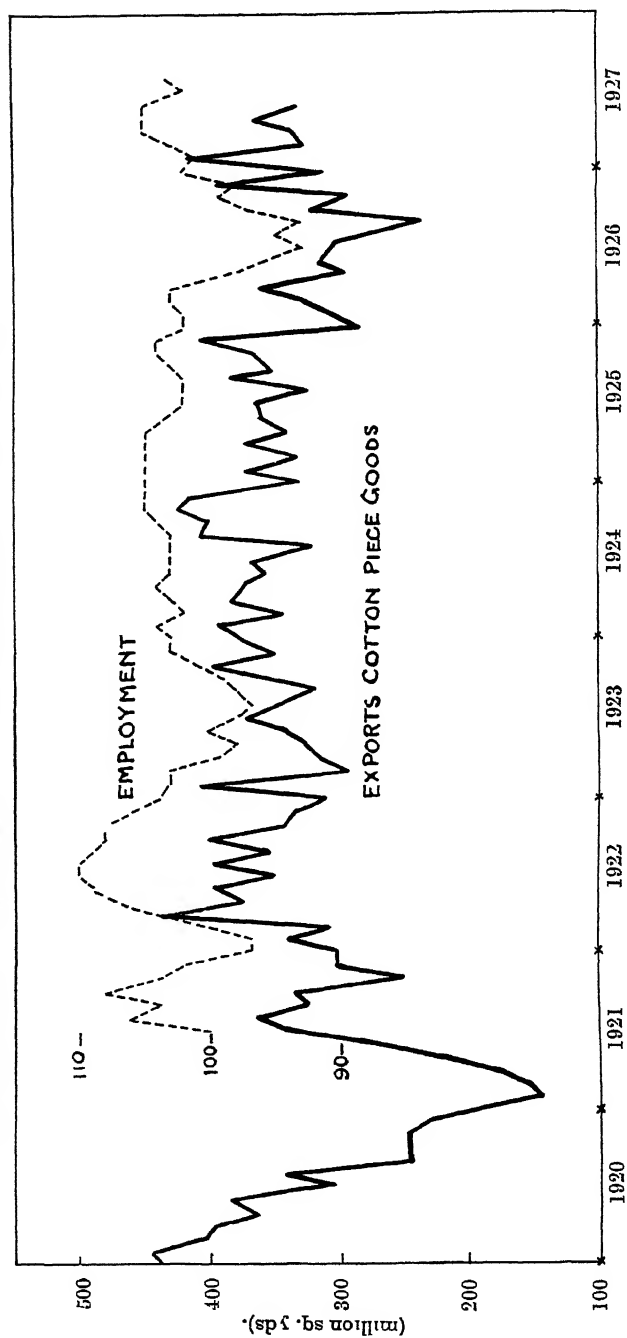
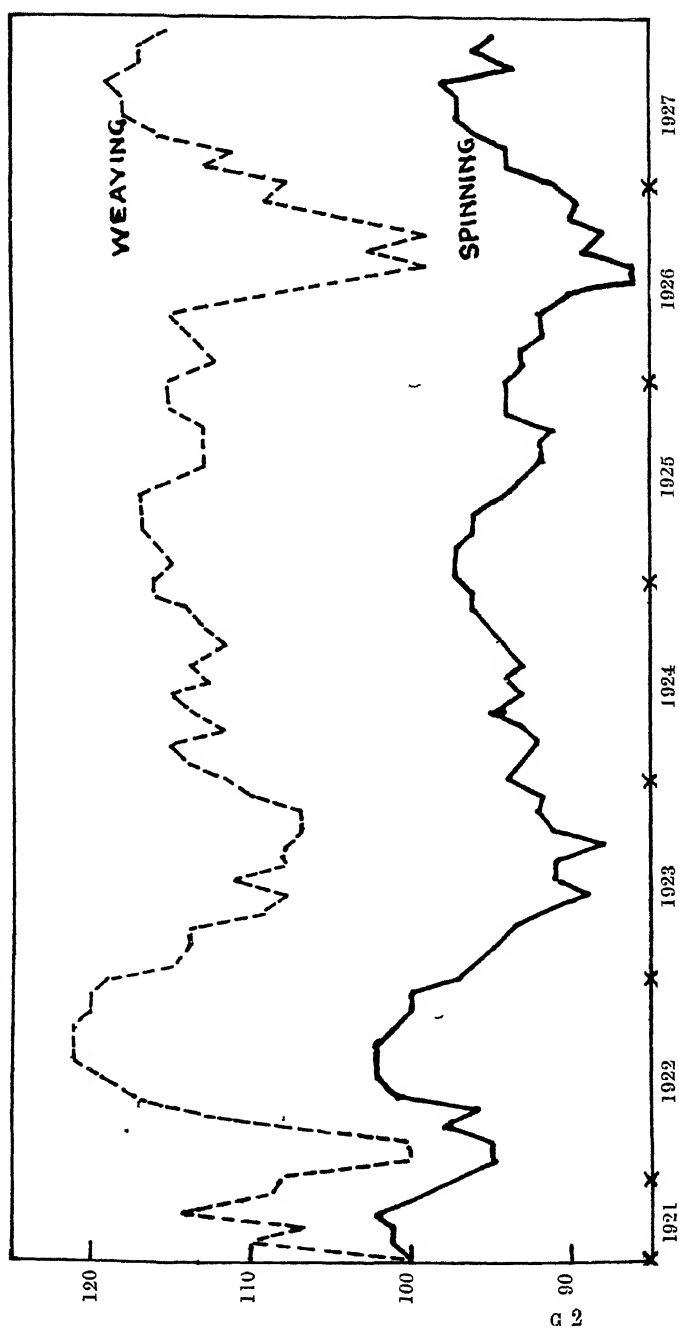


CHART II.
Employment in the Spinning and Weaving Sections of the Cotton Industry. 1920-27.



in the middle of 1925. The later part of all the curves reveals the influence of the coal strike and the recovery from it.

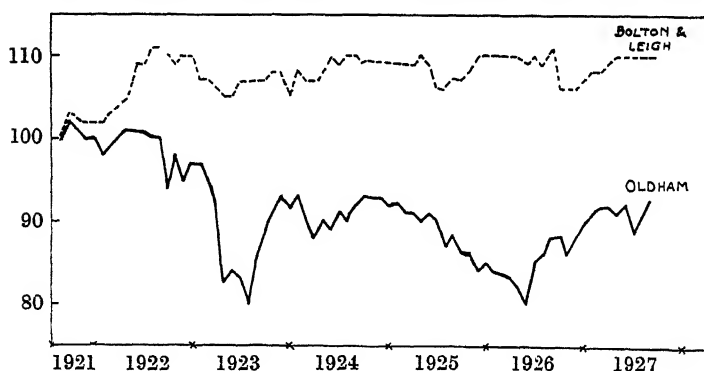
After the 1922 peak, employment shows a certain constancy save for the operation of temporary and abnormal factors. A comparison of the curves for the spinning and weaving sections suggests, however, that the spinning section has been less prosperous than the weaving, though the limited validity of the index weakens the degree of certainty with which conclusions deduced from these curves can be stated. On the whole the general trend of the spinning curve is downwards while that of the weaving is more level.

C.—The Movement of Employment in the Different Sections of the Industry.

The production of the finer and coarser qualities of yarn and piece-goods in the Lancashire cotton industry is so intensively localised that it is possible, by comparing employment in different areas, to gain a general idea of the varying degrees of industrial

CHART III.

Cotton Industry: Employment in Oldham and Bolton and Leigh.



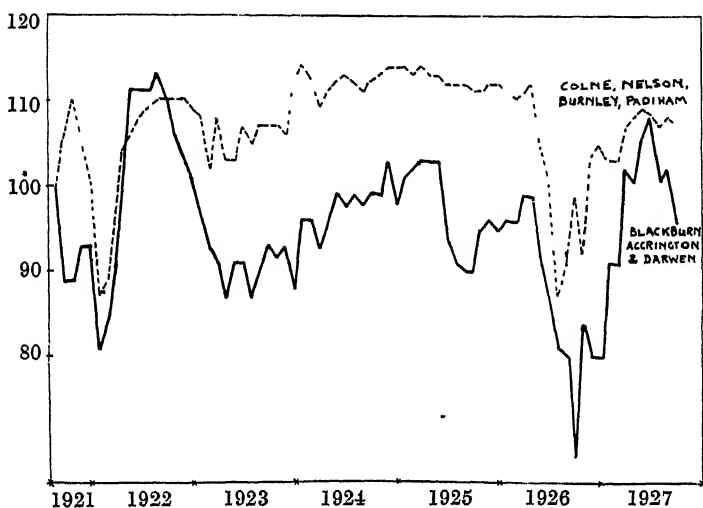
fortune which have been experienced by the different sections of the industry. On the spinning side, Bolton is the centre for the production of the finer yarns made from Egyptian cotton, and Oldham the centre for the production of the coarser yarns, made from American cotton. The curves given in Chart III show that, in Bolton, employment has been comparatively stable since 1922, whereas, in Oldham, it has fluctuated, with, if anything, a general downward trend.

In the weaving section of the industry the coarser cloth is produced largely in the Blackburn, Accrington, and Darwen area, while

Preston and Chorley produce a higher quality of cloth. The finest goods are woven in Colne and Nelson, but, unfortunately, the figures in the *Labour Gazette* do not give these two towns as a separate group, but include them with Burnley and Padiham, where the product is not so fine. The group Burnley, Padiham, Colne and Nelson may, however, be taken as an area producing goods of high average quality. Here again in Chart IV employment is seen to be more fluctuating with a greater downward tendency in the areas producing coarser goods than in those engaged in the finer branch of the trade.

CHART IV.

Cotton Industry: Employment in Blackburn, Accrington, Darwen and Colne, Nelson, Burnley, Padiham. 1920-27.



The employment figures, therefore, confirm what was suggested in Section 1 of the incidence of the depression. At the moment the industry, both on the spinning and weaving sides, presents a patchwork of depression and comparative prosperity. The American section has undoubtedly suffered badly, and shows no conspicuous tendency to recovery. On the other hand, the Egyptian section has fared much better, and promises to do so in the future. Consequently, it seems clear that, beyond certain general factors which are influencing the trade as a whole, some influences peculiar to the American section are in operation, rendering that section less able to maintain its former position in world-markets than the Egyptian section of the industry.

TABLE VIII.

Percentage Share of Great Britain and her most Important Competitors in Total Cotton Piece-Goods Imported into Certain Markets.

Percentages based upon Weight.

| Year. | India. | | China (a). | | Egypt. | | Dutch East Indies (b). | | | Argentina. | | Brazil. | | U.S.A. | |
|------------|--------|--------|------------|--------|--------|--------|------------------------|------------------|-------|------------|--------|---------|--------|--------|--------|
| | G.B. | Japan. | G.B. | Japan. | G.B. | Italy. | G.B. | Nether lands. | Japan | U.K. | Italy. | U.K. | U.S.A. | U.K. | Japan. |
| 1911 | 96 | * | — | — | 86 | 7 | 48 | 44 | * | — | — | 72 | 2 | 80 | * |
| 1912 | 97 | * | 55 | 18 | 90 | 5 | 46 | 45 | * | — | — | 69 | 2 | 78 | 3 |
| 1913 | 97 | * | 50 | 23 | 89 | 5 | 45 | 45 | * | 53 | 27 | 71 | 3 | 72 | 4 |
| 1921 | 87 | 10 | 27 | 57 | 88 | 8 | 36 | 32 | 19 | — | — | 69 | 7 | 50 | 8 |
| 1922 | 92 | 6 | 32 | 54 | 85 | 11 | 36 | 34 | 17 | — | — | 76 | 9 | 64 | 9 |
| 1923 | 90 | 7 | 28 | 59 | 76 | 17 | 33 | 33 | 18 | 50 | 24 | 73 | 6 | 81 | 5 |
| 1924 | 89 | 9 | 30 | 58 | 69 | 21 | 33 | 26 | 25 | 46 | 28 | 72 | 9 | 85 | 6 |
| 1925 | 86 | 13 | — | — | 61 | 23 | 35 | 26 | 25 | — | — | — | — | 83 | 5 |

(a) Great caution must be used with the figures for China, since the presence of Hong Kong as a great distributing centre renders all trade returns unsatisfactory.

(b) Proportions based on values, Java and Madura only. Trade on Private Account.

— Figures not available. * Proportion less than 1 per cent.

SECTION 3.—COMPETITION AS A FACTOR IN THE DEPRESSION.

The factor of competition as a cause of the depression was hinted at in Section 1, when it was pointed out that what the United Kingdom has lost in world-trade in piece-goods has been almost entirely made up from other sources. Some indication of the change in certain large markets in recent years is shown on page 164.

The above table indicates increased competition. This competition was intensified during the war period, but that it was developing before is suggested in the next table, the increase of looms and spindles in India and Japan before 1913 being very noticeable.

TABLE IX.

Estimated Number of Spindles and Looms in India, Japan, Italy, U.S.A., Great Britain. 1913 = 100.*

| Year. | India | | Japan. | | Italy. | U.S.A. | | Great Britain. | |
|----------|----------|-------|----------|-------|----------|----------|-------|----------------|-------|
| | Spindles | Looms | Spindles | Looms | Spindles | Spindles | Looms | Spindles | Looms |
| 1900 ... | 75 | 43 | — | — | — | 62 | 67 | 73 | 81 |
| 1905 ... | 78 | 53 | 57 | 34 | — | 80 | 83 | 81 | 85 |
| 1909 ... | 92 | 82 | 81 | 57 | 87 | 89 | 98 | 97 | 92 |
| 1910 ... | 94 | 88 | 87 | 73 | 91 | 90 | — | 98 | 92 |
| 1911 ... | 96 | 91 | 90 | 84 | 92 | 97 | — | 98 | 94 |
| 1912 ... | 98 | 95 | 90 | 90 | 101 | 98 | — | 99 | 98 |
| 1913 ... | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| 1920 ... | 103 | 127 | 158 | 209 | 98 | 111 | — | 101 | 98 |
| 1921 ... | 104 | 132 | 173 | 227 | 99 | 114 | — | 101 | 99 |
| 1922 ... | 111 | 143 | 187 | 251 | 100 | 115 | — | 101 | 99 |
| 1923 ... | 120 | 154 | 174 | 254 | 100 | 116 | 116 | 100 | 98 |
| 1924 ... | 126 | 161 | 202 | 265 | 101 | 117 | — | 101 | 98 |
| 1925 ... | 131 | 164 | 219 | 281 | 104 | 118 | — | 102 | 98 |
| 1926 ... | 132 | — | 236 | — | 109 | 117 | — | 102 | 95 |

* Based on figures—

India : Bombay Cotton Mill-Owners' Year Book.

Japan : Japan Cotton Spinners' Association, Osaka (controlling 90 per cent. of the spindles and 40 per cent. of the looms).

Italy : International Federation of Master Cotton Spinners.

U.S.A. : Statistical Abstract of U.S.A. Bureau of Census.

Great Britain : Worrall's Cotton Trade Directory.

The significance of Table IX is the indication it gives of the extent to which the cotton industries of other countries were expanding before the war and of their expansion afterwards. In the pre-war period, however, the expansion was compatible with an increase of the average annual exports of cotton piece-goods from this

country—between 1898 and 1912 the increase was about 2 per cent. per annum. Apparently it was not so much that the Lancashire industry was able to check the growth of competition as that a rising world demand was able to support an increase in world productive capacity, an increase in world-trade in cotton manufactures, and an increase of exports from the United Kingdom. Ultimately, maybe, competition would have become more severe, even if the war had not occurred and caused the disorganisation of world-trade and prices which gave rival textile industries fuller opportunities.

That increased competition would be experienced most acutely in the American section—that which produces the coarser qualities of goods, is to be expected. The comparative advantages—natural and acquired—of the Lancashire cotton industry belong pre-eminently to the Egyptian section—that which produces the finer qualities of goods—with the consequence that normally this section is in a stronger position than the other section. No doubt this consideration has had an important bearing on the more favourable position of the Egyptian section during the present depression. On the other hand, however, we are faced with the fact that the less favourable position of the American section has existed with higher margins in that section than in the Egyptian section of the industry.

SECTION 4.—“MARGINS” IN THE AMERICAN AND EGYPTIAN SECTIONS.

The above-mentioned “margins” are those between the prices of raw cotton and yarn, and they are compared in Chart V below, which is based on the figures given in Appendix III. The index-number has been constructed in the following way:

American Margins.—For 1913, and from 1921 to 1924, the margins are those between Spot Good Middling and 32’s Cop Twist. From September 1924, on the adoption of Universal Standards, the margins are those between Spot Strict Middling and 32’s Cop Twist.

Egyptian Margins.—The margins are those between Spot F.G.F. Sakel and 60’s Cop Twist.

In both cases the margins, in pence per lb., have been reduced to 1913 values by the use of the *Statist* index of wholesale prices. With 1913 as base (= 100) the margins since 1921 are given as percentages of 1913.

As will be seen from Chart V the American margins were, during the whole period, above the 1913 level, and almost continuously showed a greater percentage increase over 1913 than the Egyptian margins.

To this statement the objection might be raised that, by taking standard qualities of raw cotton and standard grades of yarn, we have not allowed for "points on," *i.e.* additions which are made to the price of raw cotton which is of higher quality than the standard grade. Through the kindness of an important cotton manufacturer, we have had access to the actual prices he paid for his cotton—including "points on"—and the price commanded for the yarn made from this cotton. The cotton used was American, and the margins have been reduced to an index as in the preceding cases. In Chart VI the margins in this particular case are compared with the American margins contained in Chart V. Detailed figures are given in Appendix IV. It seems that, even after allowing for "points on," the margins are well above 1913 level, and proportionately greater than the Egyptian margins shown in Chart V. The curve in the particular case, however, does show falls in 1922 and 1925 in sympathy with similar movements in Egyptian margins. It appears therefore that, whilst curves based on standard grades of raw cotton and yarn exaggerate the disparity of the movements in margins in the two sections of the industry, yet they can be used with safety to indicate the broad facts that margins in the American section are greater than before the war, and, on the basis of the pre-war levels, proportionately greater than in the Egyptian section.

The difference between the American and the Egyptian sections can be explained on two main grounds. In the first place, short time in the American section has thrown the overhead costs on to a smaller total output and thus increased their weight per lb. of yarn produced. In the second place, the American section has become burdened with large fixed interest charges which the Egyptian section has, to a large extent, avoided. This point is considered in detail in the next section of this paper.

SECTION 5.—FINANCE OF THE INDUSTRY, 1919-27.*

A feature of the post-war cycle in the industry, which has no precedent in pre-war cycles of boom and depression, is the financial reconstitution of a large number of concerns. It is necessary to examine the causes, course, and effects of this movement if we are to explain the special characteristics of the post-war depression and the peculiar incidence of it upon the American spinning section of the industry.

The industry attained a high level of prosperity towards the end of the war, when large profits were earned on a very restricted output. The conclusion of hostilities was followed by a temporary

* All the tables in this section have been compiled by Mr. H. Campion and used by him in an unpublished thesis.

CHART V.

Price "Margins" (reduced to 1913 values) between Raw Cotton and Yarn in American and Egyptian Sections of Cotton Industry, 1921-26. 1913 = 100.

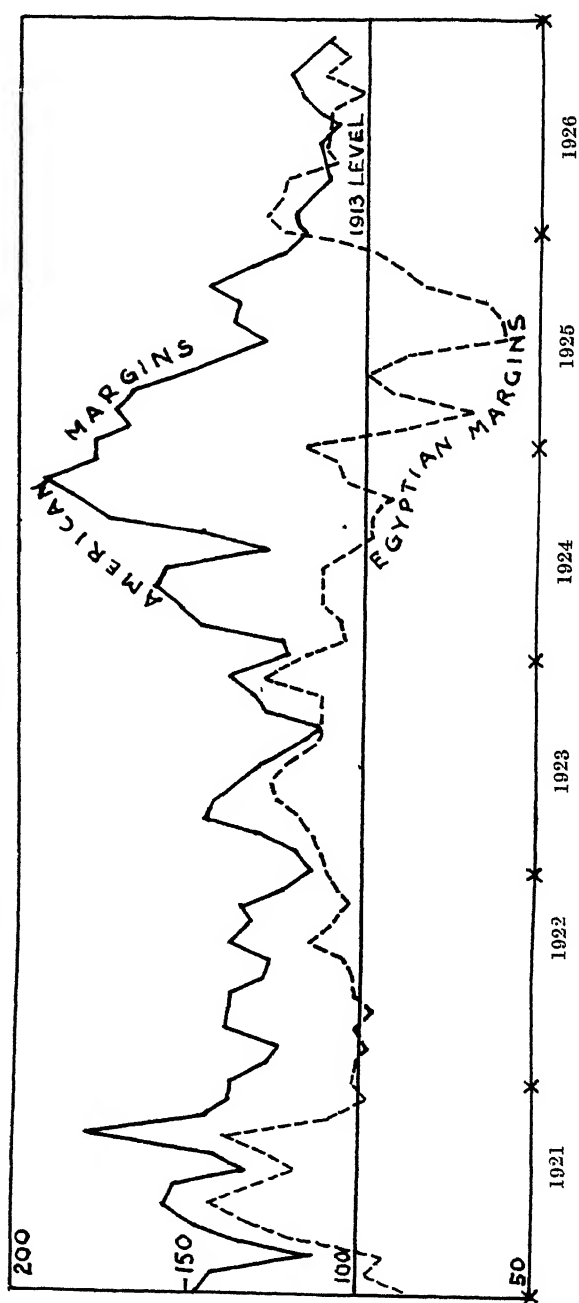
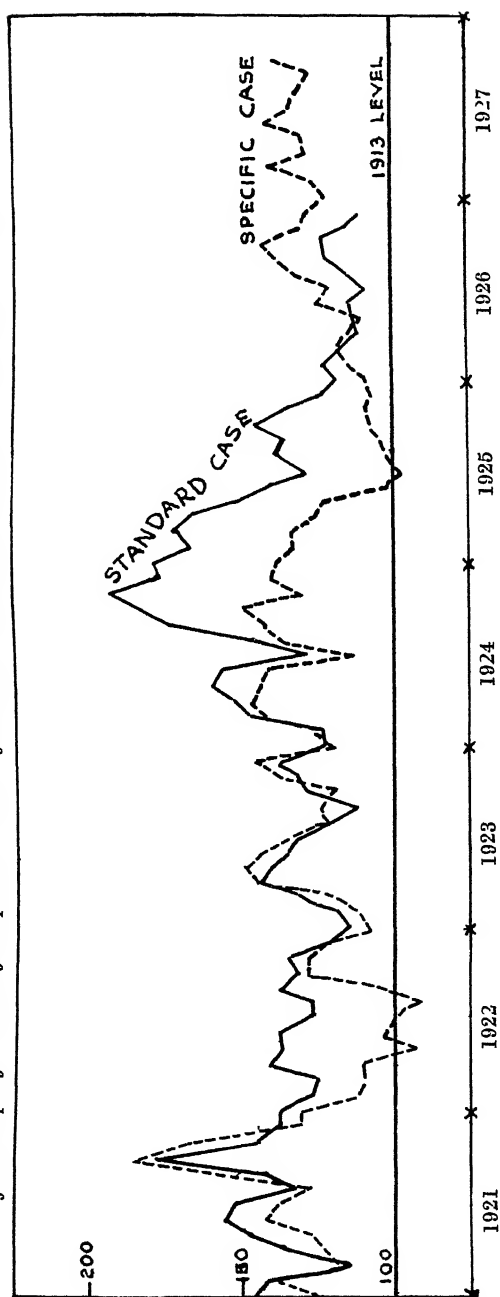


CHART VI.

American Cotton: Comparison of Price Margins between Standard Grades of Cotton and Yarn and Price Margins for a Specific Case of Superior Grades of Cotton and Yarn reduced to 1913 values. 1913 = 100.



relapse, due to the removal of the restrictions on output imposed by the Cotton Control Board, and aggravated by a dispute in the industry at the beginning of 1919. After April, however, when this dispute was settled, output and profits expanded rapidly, and continued high until the middle of 1920.

Before the war the effect of a sustained rise in profits was an expansion of the industry by the extension of existing firms and the building of new mills. In 1919 this response to demand was not possible, partly because the rise was so sudden and steep, partly because the building and equipment industries had been disorganized by the war, and could not meet at once the derived demand for their products. The response to the profits of the boom, which was due, not to increased production, but to the widening margins between raw material and the prices of manufactured goods, took the form, therefore, of a speculative financial reconstitution of existing mills.

Generally this reconstitution was effected by one of two methods, the consequence in each case being to increase the nominal capital value of the mills. The method most commonly adopted was that of refloating, whereby the shares of a company were bought by speculators at a high price in the expectation of forming a new company with a capitalization based on the exceptional profits that were being made and which seemed likely to continue. The other method was that of recapitalization, increasing the share-capital by the issue of new shares, usually bonus shares. One reason for the adoption of this latter method lay in the rapid growth of speculation. The directors of a company often found themselves besieged with new offers after they had already submitted one offer for the approval of the shareholders. Again, since it was generally the old shareholders who took up shares in the new companies, the directors often conceded to the desire for revaluation by the issue of bonus shares which the shareholders could dispose of at will.

The table on page 171 shows the growth of the reconstitution movement between March 1919 and July 1920 without regard to the method by which it was effected. Periods of four weeks have been taken and the number found of the mills reconstituted in each period, the date of registration being taken as the date of reconstitution. Actually, of course, between the events there was a gap: at the beginning of the boom it was, on the average, four weeks, at the end of the boom, two weeks.

Attempts have been made to justify this reconstitution by referring to the increase in the costs of building and equipping new mills. Nominal capital, the argument runs, should correspond with the actual value of the assets; the value of fixed assets depends

TABLE X.
Growth of Financial Reconstitution (March 1919-July 1920).

| Middle date of each four-weekly period. | No. and character of concerns reconstituted in each period. | |
|---|---|----------|
| | Spinning, and Spinning and Weaving. | Weaving. |
| March 16, 1919 | 1 | 5 |
| April 12 | 1 | 6 |
| May 10 | 3 | 5 |
| June 7 | 1 | 3 |
| July 5 | 4 | 2 |
| Aug. 2 | 3 | 2 |
| Aug. 31 | 4 | 2 |
| Sept. 28 | 11 | 1 |
| Oct. 26 | 16 | 2 |
| Nov. 23 | 20 | 7 |
| Dec. 21 | 34 | 3 |
| Jan. 18, 1920 | 36 | 6 |
| Feb. 15 | 47 | 5 |
| March 13 | 46 | 9 |
| April 10 | 34 | 3 |
| May 8 | 26 | 3 |
| June 5 | 11 | 2 |
| July 3 | 5 | 5 |
| July 31 | 2 | 5 |
| | 305 | 76 |

on, and corresponds with, replacement costs; therefore assets should be written up as the cost of equipping new mills increases. This argument is both disingenuous and misleading. It is disingenuous because it can afford no justification for the type of transaction by which the great majority of changes were effected, the purchase at one price and refloating almost immediately at a much higher capitalization; either the purchase price in such cases must have been inadequate, or the sale price excessive, in relation to the assets. It is misleading because, in fact, prices paid did not correspond with changes in the costs of building and equipping new mills. Table XI shows the changes in these costs based on information obtained from three leading textile machinery makers.

It is, however, of much greater practical importance to point out that the argument is fallacious. The value of capital assets is determined by the amount of income they yield. Mills that cost 20s. a spindle to construct, and could not be reproduced at less than 50s. a spindle, have sold for 7s. a spindle, because 7s. a spindle was the amount on which it was anticipated that the mill would yield a reasonable return. Replacement cost has some influence on earnings through its influence on depreciation allowances and

TABLE XI.

Index of the Cost of Building of Cotton Mills (1919-1921).

| | | | | | | |
|-------------------|-----|-----|-----|-----|-----|-----|
| 1913 | ... | ... | ... | ... | ... | 100 |
| 1919, 1st quarter | .. | ... | ... | ... | ... | 290 |
| 2nd | „ | ... | ... | ... | ... | 290 |
| 3rd | „ | ... | ... | ... | ... | 290 |
| 4th | „ | ... | ... | ... | ... | 319 |
| 1920, 1st | „ | ... | ... | ... | ... | 334 |
| 2nd | „ | ... | ... | ... | ... | 363 |
| 3rd | „ | ... | ... | ... | ... | 392 |
| 4th | „ | ... | ... | ... | ... | 434 |
| 1921, 1st | „ | ... | ... | ... | ... | 434 |
| 2nd | „ | ... | ... | ... | ... | 392 |
| 3rd | „ | ... | ... | ... | ... | 362 |
| 4th | „ | ... | ... | ... | ... | 347 |
| 1922, 1st | „ | ... | ... | ... | ... | 319 |

insurance costs; apart from these it does not affect earnings and therefore has nothing whatever to do with capital value.

These inconclusive arguments really represent an attempt to explain away, after the event, a movement whose results have not corresponded with anticipations. As already explained, these anticipations were based on the rapid rise of profits in 1919-20, combined with the appreciable difference between reproduction costs and the nominal capital value of existing mills. The effect of the rise in profits and the growth of speculation upon the average prices paid per 1,000 spindles during the boom is shown in the following table. The concerns taken into account are those for which the necessary particulars are available, included in Table X, the prices being arrived at by ascertaining the total number of spindles in each group and the total price paid for them.

While it is thus established that, as the boom proceeded, a higher price per spindle was paid, it should not be assumed that

TABLE XII.

Average Price Paid per 1,000 Spindles during the Boom.

| Middle date of four-weeks period. | | | | | | No. of concerns. | Price paid per 1,000 spindles. |
|-----------------------------------|-----|-----|-----|-----|-----|------------------|--------------------------------|
| | | | | | | | £ |
| Aug. 2, 1919 | ... | ... | ... | ... | ... | 2 | 1,400 |
| Aug. 31 | ... | ... | ... | ... | ... | 2 | 2,180 |
| Sept. 28 | ... | ... | ... | ... | ... | 7 | 1,970 |
| Oct. 26 | ... | ... | ... | ... | ... | 8 | 1,870 |
| Nov. 23 | ... | ... | ... | ... | ... | 10 | 2,420 |
| Dec. 21 | ... | ... | ... | ... | ... | 21 | 2,630 |
| Jan. 18, 1920 | ... | ... | ... | ... | ... | 22 | 2,800 |
| Feb. 15 | ... | ... | ... | ... | ... | 21 | 3,460 |
| March 13 | ... | ... | ... | ... | ... | 18 | 3,410 |
| April 10 | ... | ... | ... | ... | ... | 12 | 4,160 |
| May 8 | ... | ... | ... | ... | ... | 6 | 2,510 |
| June 5 | ... | ... | ... | ... | ... | 4 | 2,250 |

this was the only cause of difference in the valuations of different mills. Clearly a higher price per spindle would be paid for a more efficient, than for a less efficient, concern, taking past profits as the test of efficiency and of profit-earning capacity. Another rather different factor in valuation was the amount of loans held, for it was assumed in the majority of cases that the new company would retain the use of them. Since these loans carried only a low rate of interest, speculators were willing to offer a higher price for the shares. Yet, it is true to say that the main single cause for the differences in the new values of refloated companies was the time when they were refloated.

It has been necessary to refer to this attempted justification of the reconstitution movement, since undoubtedly it is still of influence in deferring any attempt to face the problems created by the movement. What these problems are will appear from a closer examination of its extent. We give first two tables showing the actual and relative extent in the spinning branch of the industry.

TABLE XIII.

Actual Extent of Financial Reconstitution of Spindles.

| | No. of companies. | Spindles (000's). |
|---|----------------------|----------------------|
| "Refloated" Companies (Spinning) | 200 | 18,956 |
| (Spinning and Weaving) | 17 | 1,490 |
| "Recapitalized" Companies (Spinning) | 32 | 2,962 |
| (Spinning and Weaving) | 2 | 490 |
| "Reconstituted" * Companies (Spinning) | 42 | 1,956 |
| (Spinning and Weaving) | 20 | 826 |
| Combines (Spinning and Weaving) | 3 | 2,093 |
| Total | | 28,773 |

* The word "Reconstituted" is used in these tables because it is not clear whether the companies to which it refers were "refloated" or "recapitalized."

TABLE XIV.

Relative Extent of Financial Reconstitution of Spindles.

| | | |
|--|---|------|
| Total number of spindles, 1920 | = | 100 |
| Percentage of total "Refloated" | | 37.5 |
| " " "Recapitalized" | | 6 |
| " " "Reconstituted" | | 2.5 |
| " " | | 46 |

The above tables refer to the extent of the reconstitution which took place in the spinning section between March 1st, 1919, and July 31st, 1920. No regard has been paid to the different kinds of spindles, whether ring, doubling, or mule, because by considering them all as equivalent spindles it was possible to base the percentage in the second table on Worrall's estimate of the total spindleage of the industry. Where an existing concern bought the shares of another, only the spindles of the concern purchased have been included. In cases where a mill was turned over twice, or where a mill was refloated and later absorbed into one of the combines, the spindles have been counted only once. In passing it should be noted that concerns classed as reconstituted, for which exact particulars were not available, are mostly outside the Oldham area.

Similar methods have been used in constructing tables for the weaving section.

TABLE XV.

Actual Extent of Financial Reconstitution of Looms.

| | No. of concerns. | No. of looms (000's). |
|---|------------------|--------------------------|
| "Reconstituted" Weaving Concerns ... | 65 | 44 |
| "Refloated" Concerns (Spinning and Weaving) | 17 | 25 |
| "Recapitalized" " " " | 2 | 3 |
| "Reconstituted" " " " | 20 | 16 |
| Combines | 3 | 21 |
| Total | | 110 |

TABLE XVI.

Relative Extent of Financial Reconstitution of Looms.

| | |
|--|-----|
| Total number of looms, 1920 = | 100 |
| Percentage of total "reconstituted" or otherwise dealt with ... | 14 |

Thus, by July 31st, 1920, 46 per cent. of the spindles, and 14 per cent. of the looms in the industry had been financially reconstituted. The majority of the looms, however, were those in the possession of concerns engaged in spinning and weaving, and of combines. Indeed, among firms engaged in weaving alone, financial

reconstitution was negligible and here is not considered in detail. Confining our attention to the spinning section, it is an important fact that only a part of the total spindleage was reconstituted, and the question arises whether this part was any particular part of the section. As between efficient and inefficient concerns, there seems to have been no tendency for reconstitution to take place in one type rather than the other. Nearly all the public joint-stock companies were reconstituted, which may be partly accounted for by the fact that they are more accessible to investment than other types of concerns.

A more important consideration is the divergence of policy between the American and Egyptian sections of the spinning industry, of which a clear indication is given in the following table :

TABLE XVII.

Reflation in American and Egyptian Sections.

| | No. of concerns | No. of spindles (000's). |
|------------------------------|-----------------|-----------------------------|
| American Section | 137 | 11,445 |
| Egyptian „ | 29 | 3,867 |
| American and Egyptian | 40 } | 5,134 |
| Not known | 11 } | |
| | 217 | 20,446 |

In view of what has been said it is clear that the effects of the reconstitution movement, whatever they may be, would be felt most in the spinning branch of the industry, and especially in that section engaged on American cotton. Now, had the movement taken the form simply of a purchase of mills by new companies, which raised the whole of the purchase-money by the issue of fully-paid ordinary shares, or by the issue of fully-paid ordinary bonus shares without any transfer of ownership, the subsequent depression of the industry would have involved the holders of these ordinary shares only in the loss of any return on them, and would not have affected anyone else. The methods adopted were, however, very different. Ordinary shareholders were not called on to supply, on an average, much more than half the purchase-price paid. Shares were usually only partly paid up, and the balance of the price required was found, partly by the system of accepting loans on deposit, partly by large advances from banks.

It is not possible to give completely inclusive figures, particularly since the new companies were hurriedly promoted, and often short

cuts made in customary procedure. However, particulars relating to the formation of approximately three-fifths of the refloated companies are summarized in the next table :

TABLE XVIII.

Character of the Financial Reflotation of 129 Companies (1919-20).

| | | | | | |
|--|-----|-----|-----|-----|--------------|
| Total purchase price | ... | ... | ... | ... | £ 38,257,000 |
| Paid-up share capital | ... | ... | ... | ... | 18,976,500 |
| Premiums paid on shares | ... | ... | ... | ... | 2,405,500 |
| | | | | | 21,382,000 |
| Total amount to be raised by loans, bank over- drafts, debentures | ... | ... | ... | ... | 16,875,000 |

The figures show quite definitely that the speculators relied largely on the banks and on loan-holders to carry through their deals. Indeed, according to the figures given above, shareholders were called upon to provide only 55 per cent. of the money needed, the remainder being raised by loans, bank overdrafts, and debentures. This proportion would be altered if it were possible to take account of the formation expenses of the new companies, such as registration fees, and gifts to old directors, which were, no doubt, a considerable item. This last consideration spoils any attempt to estimate how much was provided by the banks and loanholders. A rough estimate might be, half by the shareholders, and half by the banks, loanholders, and debentures. This is borne out by an examination of the balance sheets of the companies in the above sample at the beginning of 1921 :

TABLE XIX.

Position of the same 129 Companies in January 1921.

| | | | | | |
|-----------------|-----|-----|-----|-----|--------------|
| Loans | ... | ... | ... | ... | £ 17,056,700 |
| Bank overdrafts | ... | ... | ... | ... | 5,313,500 |
| Debentures | ... | ... | ... | ... | 1,200,600 |
| Total | ... | ... | ... | ... | 23,570,800 |

It should not be inferred, however, that the whole amount of the loans in the above table was raised by the new companies, for these companies took over the loans of the old companies they replaced; but, as regards bank overdrafts, it can safely be said that

these were incurred during and after refloating. As the figures relate to the beginning of 1921, it may be that, by that time, some overdrafts had been replaced by loans, and also that the growing depression had forced some companies to seek for greater accommodation from banks.*

Now the fact that the new companies were largely financed by overdrafts and loans is exceedingly important, because this capital bears fixed interest, and is a prior charge, which has to be met whether profits are made or not. Thus, if a concern so capitalized is to remain solvent it will, even in a time of stress, require a price which will not only cover prime costs, but also interest charges, whereas a concern capitalized by share-capital only can, at such a time, remain solvent if the price just covers prime costs. It is not so much the reconstitution movement itself, as the fact that it was carried through largely by the employment of fixed interest capital, which is the important feature of the financial problem.

The exact way in which this method of financing the reconstitution by piling up fixed interest charges has affected the industry cannot be fully understood until two further calculations are made: first, the distribution of the burden among competing concerns, which is very uneven; and second, the progress that has been made in reducing the burden, or in adjusting the capacity of the industry to bear it. An attempt is made to make these calculations in the following tables. Table XX, which follows, shows, as nearly as can be ascertained, the amount of fixed interest capital which a sample of different types of concerns were carrying at the beginning of the year 1927:

TABLE XX.

| | No. of companies. | Spindles (000's). | Loans, over- drafts, debentures (£1000's). | Amount of fixed interest capital per 1,000 spindles. |
|-------------------------|----------------------|----------------------|---|---|
| Original Companies ... | 62 | 5,845 | 3,460 | £592 |
| Recapitalized Companies | 23 | 1,882 | 404 | 263 |
| Refloated Companies ... | 171 | 16,904 | 28,897 | 1,710 |

In the table no allowance has been made for ring spindles, and a larger sample of original, and of recapitalized, companies could not be obtained. These deficiencies, however, cannot disguise the fact that the refloated companies carry by far the greater proportion of the amount of fixed interest capital. How the burden of fixed

* See Table XXIV.

interest charges is distributed among companies is indicated in the next table :

TABLE XXI.

Amount of Fixed Interest Capital per 1,000 Spindles carried by 160 Refloated Companies—Jan. 1927.

| Amount per 1,000 spindles. | No. of companies. | Equivalent spindleage ('000's). |
|----------------------------|-------------------|---------------------------------|
| £ | | |
| 0—500 | 10 | 969 |
| 500—1,000 | 31 | 3,472 |
| 1,000—1,500 | 40 | 4,058 |
| 1,500—2,000 | 35 | 3,563 |
| 2,000—2,500 | 18 | 2,301 |
| 2,500—3,000 | 13 | 1,638 |
| 3,000—3,500 | 7 | 759 |
| 3,500—4,000 | 3 | 249 |
| 4,000—4,500 | 3 | 146 |
| Total | 160 | 17,155 |

Turning to the other question, the extent to which the burden has been reduced, an investigation was made into the finances of approximately four-fifths of the refloated companies with the following result.

TABLE XXII.

Reduction of Fixed Interest Capital carried by 171 Refloated Companies, 1921–27.

| Approx. date. | Index-number. |
|------------------|---------------|
| Jan. 1921 | 100 |
| Jan. 1922 | 103 |
| Jan. 1923 | 104 |
| Jan. 1924 | 102 |
| Jan. 1925 | 94 |
| Jan. 1926 | 93 |
| Jan. 1927 | 90 |

Apparently the total amount of fixed interest capital carried by these companies has not been largely reduced since 1920. The reduction of fixed interest capital amounts to about £3 million. During the period, however, calls were made to the extent of £6 million, therefore it would appear that the financial position of the companies has changed for the worse.

But, although the amount of fixed interest capital has not been much reduced since 1920, there has been a definite change in its character. One change has been the consolidation of unsecured

TABLE XXIII.
Amount of Calls made by 171 Refloated Companies.

| Year. | | | | | | £000's. |
|-------|-----|-----|-----|-----|-----|---------|
| 1921 | ... | ... | ... | ... | ... | 1,505 |
| 1922 | ... | ... | ... | ... | ... | 516 |
| 1923 | ... | ... | ... | ... | ... | 1,265 |
| 1924 | ... | ... | ... | ... | ... | 787 |
| 1925 | ... | ... | ... | ... | ... | 468 |
| 1926 | ... | ... | ... | ... | ... | 1,558 |
| Total | ... | ... | ... | ... | ... | 6,099 |

advances and, in some cases, of sundry debts, into debentures and mortgages. Another and more important change is an increase of bank overdrafts, probably caused by a drain on loan-money, and by further accommodation granted by banks to help the companies through the depression. It is not possible in all cases to distinguish bank overdrafts from other liabilities; in 145 cases, however, it is possible, and the movement of aggregate bank overdrafts in these cases is given in the next table.

TABLE XXIV.
Movement of Bank Overdrafts in 145 Refloated Companies.

| Approx. date. | | | | | | Index-number. |
|---------------|-----|-----|-----|-----|-----|---------------|
| Jan. 1921 | ... | ... | ... | ... | ... | 100 |
| Jan. 1922 | ... | ... | ... | ... | ... | 121 |
| Jan. 1923 | ... | ... | ... | ... | ... | 132 |
| Jan. 1924 | ... | ... | ... | ... | ... | 152 |
| Jan. 1925 | ... | ... | ... | ... | ... | 127 |
| Jan. 1926 | ... | ... | ... | ... | ... | 125 |
| Jan. 1927 | ... | ... | ... | ... | ... | 148 |

It will be seen, therefore, that the banks played an important part in financing a large proportion of the refloated companies in the industry. It is, however, quite certain that they never intended to supply the new companies with a large part of their capital requirements on overdraft for long. They were caught with their clients by the sudden collapse, which left them with large frozen advances, and even, it would appear, compelled them to increase their advances. Probably they made these advances on the assumption that they would be repaid by money raised on loan. Actually, instead of loan-money increasing, it has been subjected to a drain since 1921, though it did not become serious until 1927. One probable reason for the delay is that some loanholders are shareholders. Thus a call on shares made by one company tends to a

withdrawal of loan-money from other companies. As compared with debenture-holders, loanholders are unsecured creditors, though it has always been understood that they had a safeguard in uncalled share-capital. Since 1921 this share-capital has been used as security for further advances; therefore it is, to some extent, circular reasoning to argue that the drain on loan-money has caused an increase of secured advances, for this increase has been one cause of the withdrawal of loans. The privilege of loanholders was that of being able to withdraw their loans at short notice, no doubt a necessary precaution in the absence of definite security, but it is an obvious weakness in the finance of the industry in a time of depression such as the present.

To sum up: the financial reconstitution of the industry during the boom, although not entirely confined to the American spinning section, affected a much larger proportion of that than of any other section, so that it may reasonably be regarded as a partial explanation of the difference between the fortunes of that section and other sections. It has had an important effect because it imposed heavy fixed charges which had to be met whatever the condition of the industry. Whereas other industries which increased their capitalization during the boom did so by obtaining additional capital by an ordinary issue of shares, and consequently could meet competition in the subsequent depression by foregoing any profits, and cutting prices to bare prime costs, the refloated concerns in the American section of the cotton industry have not been able to adopt this latter policy without involving themselves in bankruptcy. The burden has not, however, fallen evenly upon all the concerns in the section; on the contrary, it is very unevenly distributed. A large proportion of the spindles were unaffected by the movement, while the debt charges incurred by the rest varied from a few shillings to more than £4 a spindle.

The full effect of these charges can be understood only if they are considered in connection with two other incidents of the depression—the fall in the price of yarn and the policy of short-time working. Fixed interest charges assumed when the wholesale price level was at or near its peak in 1920 would, in any case, have involved a growing real burden as the general level of prices fell; the pounds which the banks lent to spinners in 1920 were worth only half as much as the pounds that the banks were able to recover by repayment of advances during the transient improvement in the trade in 1924. But yarn prices in 1920 were above the general level of prices, and have suffered proportionately a greater fall; a very much larger proportion of the gross receipts of a spinning concern with heavy prior charges would be required to meet these charges in 1926, or 1927, than in 1920.

The short-time policy adopted by the industry, as soon as demand fell off in 1920, has aggravated rather than relieved the situation. Adopted as the traditional method of meeting depression in the industry, its object was now a raising of prices by restriction of output. Evidently, restriction of output could do nothing to relieve the situation, even if it did result in higher prices than would otherwise have ruled, unless the rise were greater than the increase in cost per lb. of yarn necessarily involved when fixed charges had to be spread over a smaller number of lbs. of output. But, for the policy to be effective meant that prices must be so raised that the concerns most heavily burdened with interest charges would be able to meet these charges, and whether, even when the world was as dependent upon Lancashire for cotton goods as it was before the war, this object could have been attained is open to doubt.

Under the prevailing circumstances, it is quite certain that the policy of restriction did not raise prices sufficiently to meet the needs of all the concerns, and there were two classes of concerns under a strong inducement either to ignore the policy or to act in a way which made its continuance impossible. As already mentioned, concerns with small bank or loan charges can safely sell at a price which yields a less return over prime costs than the return which is necessary to concerns with larger charges. Consequently the inducement to the former concerns to restrict their output, in order to get higher prices, was weaker than the inducement to the latter; rather they were strongly induced, when others worked short time, to secure the advantages of full-time working, and sell at such prices as would enable them to market their full-time output. The other class of concerns was composed of those with heavier charges than the sales they could make at the higher prices consequent upon the policy of restriction would cover. Consequently, they were strongly induced to cut prices, because larger sales at these prices might yield them a larger total return to meet their charges than smaller sales at the higher prices. It is not surprising, therefore, that the short-time policy has failed. What is surprising is that so few firms have actually gone into liquidation; the explanation is partly, no doubt, to be found in the concurrent increase in debt charges and in the calling up of unpaid capital since 1921, of which we have given a measure above; partly in the number of schemes sanctioned by the Court, on applications supported by creditors, under which concerns, are relieved of the obligation to meet interest charges on their due dates, but schemes which leave the charges to accumulate for the period of the moratorium. Such arrangements as these are, of course, a solution of a concern's difficulties only on the assumption that the difficulties of the trade are temporary, an assumption which the material we have been able to collect does not support.

It is significant that the Egyptian section of the spinning industry, which, as we saw, is not so largely under the pressure of heavy fixed charges, while it also adopted short-time at the outset of the depression, relinquished that policy in 1921, and has practised no organized restriction of output since then. As stated at the beginning, our intention in this paper is to throw a little light on the depression in the cotton industry. Undoubtedly the fundamental cause of the depression is the changes in the demand for cotton goods and in their supply in the large markets since 1913. Had there been no such policy in Lancashire as we have indicated it is certain that the American section of the industry would have had a large problem to face on the conclusion of the war. The result of the policy is that it has seriously weakened the industry, when more than ordinary strength was needed; hence the prospects in the immediate future, for a large part of the American section, seem anything but favourable.

APPENDIX I.

1. The method of constructing the index (p. 158) may be explained by an example, the figures in which have been taken quite at random.

| Month. | Percentage increase (+) or decrease (—) on previous month. | Index. | |
|--------------|--|--------|--------------------------------|
| July | | 100 | |
| Aug. | +20 | 120 | i.e. $100 \times 120 \div 100$ |
| Sept. | — 5 | 114 | i.e. $120 \times 95 \div 100$ |
| Oct. | —10 | 102·6 | i.e. $114 \times 90 \div 100$ |

The precise value of the index requires a close scrutiny. The index is based on the returns published monthly in the *Ministry of Labour Gazette*. Returns of the numbers employed are received from employers who choose to make them, and the percentage increase or decrease in the present month on the previous month is given. It must be borne in mind that the returns are not the returns of the same employers throughout the period covered by the index. Starting with the position in a certain month as basis, our method implies, however, that the percentage increases or decreases in succeeding months can be brought into relation with the basis month. The validity of the index as an indication of the fluctuations of employment depends, therefore, on the extent to which the returns from a changing sample of employers give a correct view of these fluctuations in relation to the position in the basis month.

2. The choice of a suitable basis month is important. Our desire to make the chain as long as possible has caused us to take

July, 1921, as this month; an earlier month would have been taken but for a strike which broke the continuity of the chain. In any case, the movements for a short period after the basis month should be regarded with caution, as any marked peculiarities they exhibit may be due to abnormalities in the basis month. The main use of the index is for the determination of general trends.

3. The figures provided in the *Gazette* are obscure on certain points. They cannot, of course, take into account under-employment of machinery. Is the classification of spinning and weaving an industrial or an occupational one? Do the figures allow for short-time? Will an employer with 500 workpeople on half-time record his numbers as 500 or 250? How far do the geographical divisions of the tables correspond with either the field of operation of the Employment Exchanges or with the areas of Local Authorities? Is the sample contained in the tables representative? Are the firms which make returns typical of their branch of the cotton industry or of the areas in which they are situated? Is it not likely that these firms are more progressive and therefore the more prosperous firms?

4. Some idea of the extent of the sample can be gained from a comparison of the monthly figures with the returns given in the Census of Population, 1921. The numbers of workpeople covered by employers' returns has, recently, been about 75,000. The total numbers in England and Wales, engaged in cotton manufacture, following the Industry Tables of the Census, Order VII. i., is about 596,000, so that the sample is probably one of about 13 per cent. of the total, which compares very unfavourably with the extent of the sample which Mr. Wood was able to provide for the woollen industry.

The quality of the sample in its distribution over the different processes cannot be so nearly determined, because it is unlikely that the basis of the collection of employers' returns corresponds to either the industrial, or occupational, classification of the Census. Using the industrial classification of the Census we have the following comparison:—

Distribution over Process.

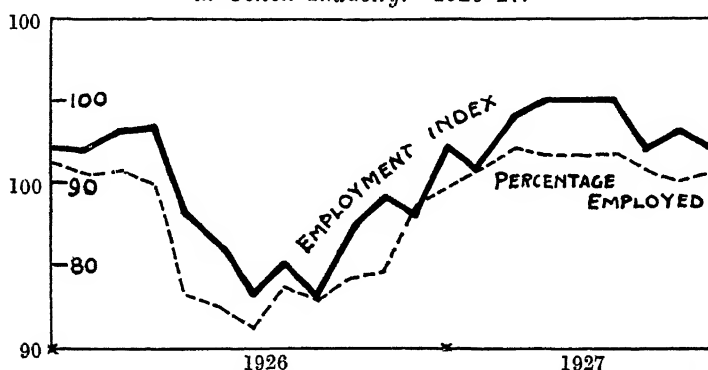
| Workers included in employer's returns. | | Workers in industry, Order VII. i. | |
|---|-----|------------------------------------|------|
| Process. | %. | Process. | %. |
| Preparing and spinning ... | 40 | Cotton carding ... | } 35 |
| Weaving | 41 | Spinning and doubling ... | |
| Other | 10 | Cotton weaving ... | |
| Not specified | 9 | Other or undefined ... | 1 |
| | 100 | | 100 |

This comparison suggests that weaving is probably under-represented in the employers' returns, but the undefined items make a definite assertion impossible.

Again, the degree of uncertainty as to the strict comparability of the geographical areas in the two sets of figures makes it difficult to determine how far the employers' returns are drawn from different centres in the proportions of the total cotton workers in these centres. It appears, however, that the larger centres occupy in the employers' returns rather too important a place. Perhaps this is only to be expected in the case of voluntary information. Thus,

CHART VII.

Employment Index (July 1921 = 100) and Percentage Employment in Cotton Industry. 1926-27.



Note.—The inner figures in this and the following charts relate in each case to the broken curve.

the County Borough of Oldham, according to the Census, contained only 5 per cent. of the total number of workers engaged in the cotton industry, but the centre "Oldham" represents 9 per cent. of the total in the employers' returns. Corresponding figures for the County Borough of Bolton and the Municipal Borough of Leigh, taken together, are 7 per cent. and 15 per cent.

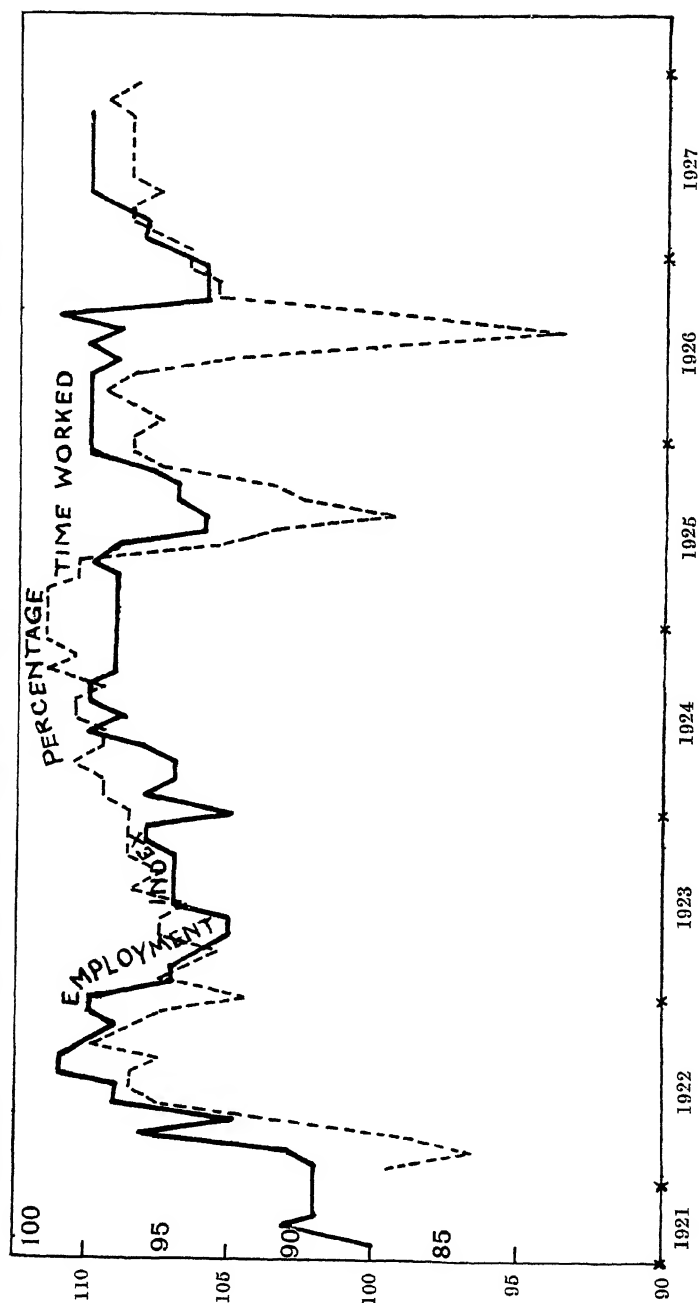
5. A sample of 13 per cent. somewhat misplaced over the field from which it is drawn may still provide a fairly accurate index of the movement which it is our object to disclose. With this consideration in mind the indexes we have produced have been compared with diverse series which are available, relating either to special areas for the whole period, or to the whole area for limited periods. They are as follows:—

(a) Comparison of Total Employment in Cotton Industry, based upon Employers' Returns with figures of Unemployment among Insured Persons in the industry given by Ministry of Labour.

The latter figures have been given monthly since January 1926,

CHART VIII.

Employment Index for Bolton and Leigh and Percentage Time Worked by Bolton Spinners. 1921-1927.



and take into account short-time workers. On Chart VII they are plotted in reversed percentages against the index based on the employers' returns, and, for the limited period dealt with, the two curves move closely together.

(b) Comparison of Index of Employment in Bolton and Leigh obtained from Employers' Returns with percentage time lost by Bolton Spinners.

It was unavoidable to group Bolton and Leigh together in the index since they are given together in the monthly tables. As, however, the two areas are engaged in the same type of spinning, conditions will tend to coincide in the two areas. The figures of percentage time lost have been obtained from the Trade Union officials in Bolton. Throughout the period they refer to the last week in each month and allow for short time worked. When the information is put into a curve of percentage time worked the correlation between the two curves is obvious (Chart VIII).

(c) Comparison of Index of Employment at Oldham obtained from Employers' Returns with percentage of Members of Oldham Operative Spinners' Trade Union "on the funds" of the Union.

The percentage of the total number of members of the Spinners' Trade Union who are "on the funds" of the Trade Union through stoppage of work is not an ideal index of the unemployment in Oldham. Many cotton operatives are not in the Spinners' Union, but in the Union covering the process in which they are engaged. A member does not come "on the funds" until he has been unemployed three days; members from time to time run out of benefit; and changes which have been made in the administration of the scheme in the last few years spoil the sequence of the series. But, in the absence of more satisfactory material, it provides a rough test of the broad movements indicated by the index. The inverse correlation between the curves, ignoring minor and temporary fluctuations, is sufficiently well marked to justify the general reliability of the index (Chart IX).

(d) Comparison of Index of Employment in Blackburn, Accrington and Darwen, obtained from Employers' Returns with percentage of Total Looms running in Blackburn.

Here again the grouping of three towns is imposed upon us by the form in which the material is supplied in the *Ministry of Labour Gazette*, but, also again, the similarity of the work done in the three centres—weaving of goods, on the whole, of a fairly low quality—suggests that the movements of employment will be roughly the same. The percentage of total looms running was supplied by the local Trade Union of Weavers, Warpers, and Winders, and refers to the last Saturday of each month. Here the similarity of movement between the two curves since 1923 is very striking.

CHART IX.
Oldham: Employment Index and Percentage of Spinners in Provincial Association "On Funds."

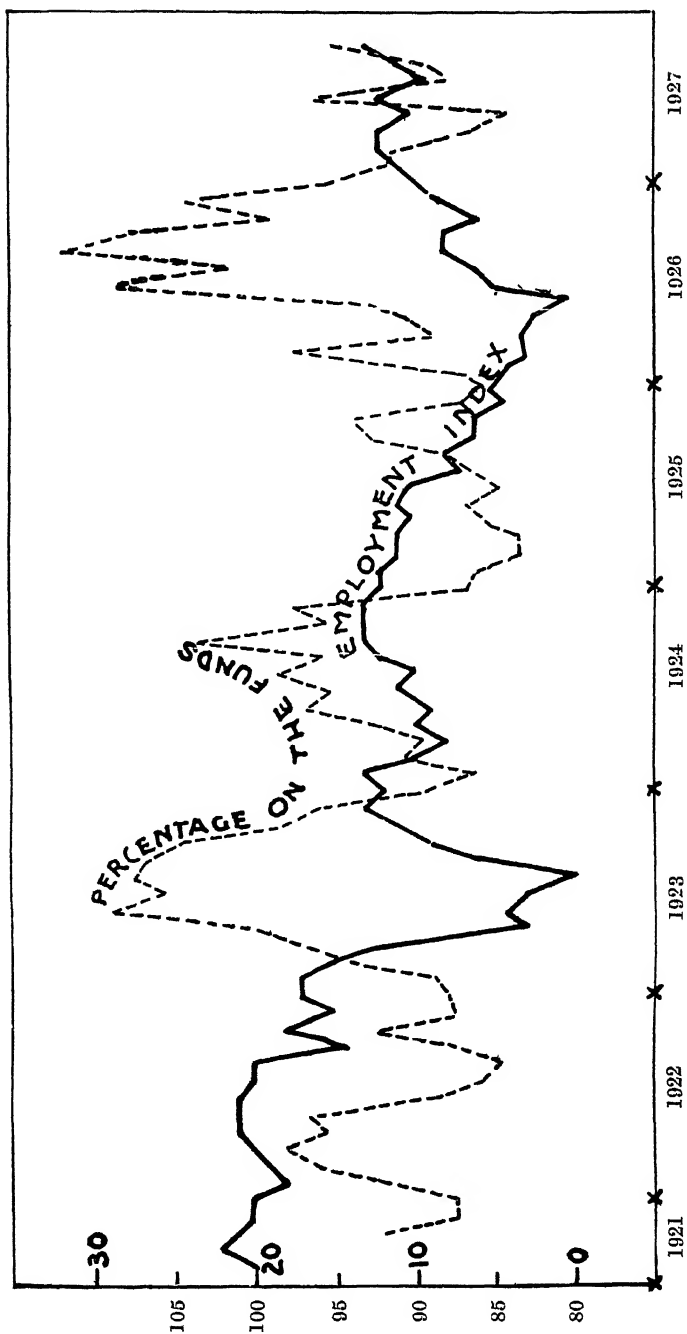
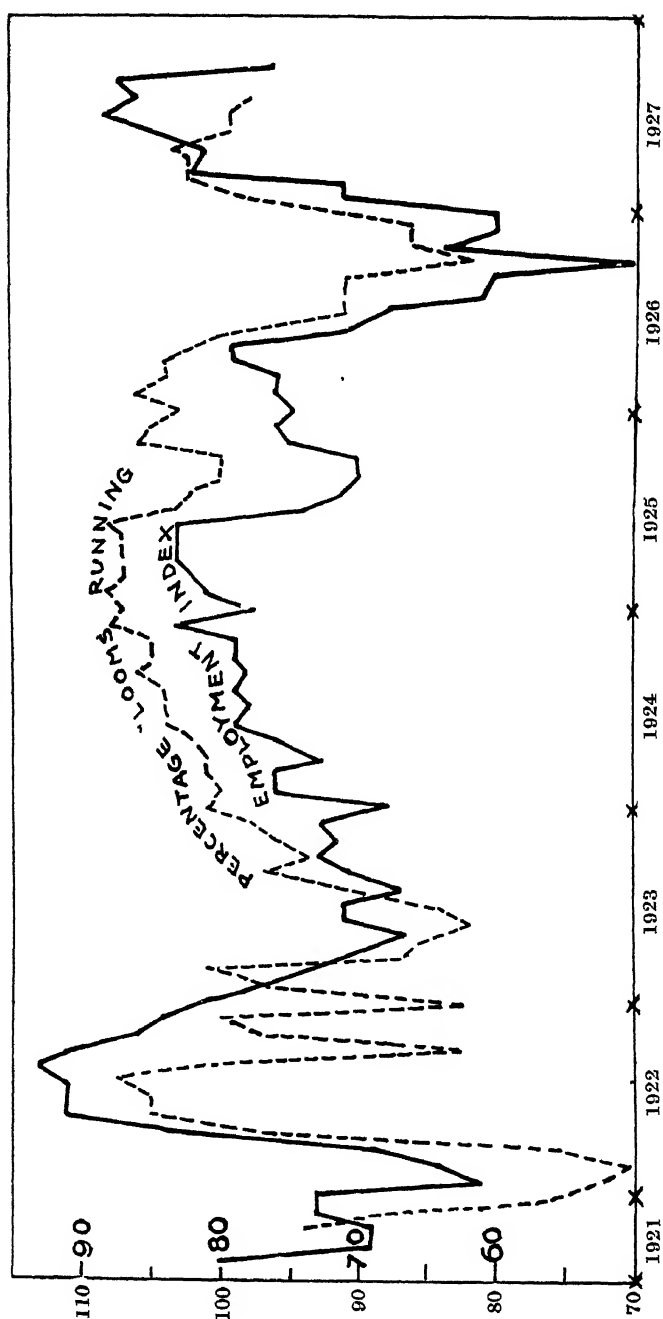


CHART X.
Employment Index for Blackburn, Accrington, Darwen, and Percentage of Total Looms Running in Blackburn.
1921-27.



Indexes of Employment in Cotton Industry compiled from Voluntary Returns of Employers.

| Year. | Total | Spinning | Weaving. | Oldham. | Bolton and Leigh | Preston and Chorley. | Blackburn, Accrington and Darwen. | Burnley, Padiham, Colne and Nelson. |
|-------------|-------|----------|----------|---------|------------------|----------------------|-----------------------------------|-------------------------------------|
| 1921 | | | | | | | | |
| July ... | 100 | 100 | 100 | — | — | — | — | — |
| Aug. ... | 106 | 101 | 110 | 100 | 100 | 100 | 100 | 100 |
| Sept. ... | 104 | 101 | 107 | 102 | 103 | 107 | 89 | 106 |
| Oct. ... | 108 | 102 | 114 | 101 | 102 | 114 | 89 | 110 |
| Nov. ... | 104 | 99 | 109 | 100 | 102 | 106 | 93 | 105 |
| Dec. ... | 102 | 97 | 108 | 100 | 102 | 103 | 93 | 101 |
| 1922 | | | | | | | | |
| Jan. ... | 97 | 95 | 100 | 98 | 102 | 99 | 81 | 87 |
| Feb. ... | 97 | 95 | 100 | 99 | 103 | 93 | 84 | 89 |
| March ... | 100 | 98 | 107 | 100 | 108 | 102 | 89 | 97 |
| April ... | 103 | 96 | 113 | 101 | 105 | 108 | 103 | 104 |
| May ... | 107 | 101 | 117 | 101 | 109 | 109 | 111 | 106 |
| June ... | 109 | 102 | 119 | 101 | 109 | 110 | 111 | 108 |
| July ... | 110 | 102 | 121 | 100 | 111 | 113 | 111 | 109 |
| Aug. ... | 110 | 102 | 122 | 100 | 111 | 112 | 113 | 110 |
| Sept. ... | 109 | 101 | 121 | 94 | 110 | 112 | 111 | 110 |
| Oct. ... | 108 | 100 | 120 | 98 | 109 | 112 | 106 | 110 |
| Nov. ... | 108 | 100 | 120 | 95 | 110 | 112 | 104 | 110 |
| Dec. ... | 106 | 97 | 119 | 97 | 110 | 110 | 101 | 109 |
| 1923 | | | | | | | | |
| Jan. ... | 104 | 96 | 115 | 97 | 107 | 105 | 97 | 108 |
| Feb. ... | 103 | 95 | 114 | 95 | 107 | 109 | 94 | 102 |
| March ... | 103 | 94 | 114 | 92 | 106 | 108 | 91 | 108 |
| April ... | 99 | 92 | 109 | 83 | 105 | 99 | 87 | 103 |
| May ... | 98 | 89 | 108 | 84 | 105 | 95 | 91 | 103 |
| June ... | 100 | 91 | 111 | 83 | 107 | 96 | 91 | 107 |
| July ... | 98 | 91 | 108 | 80 | 107 | 101 | 87 | 105 |
| Aug. ... | 97 | 88 | 108 | 86 | 107 | 101 | 91 | 107 |
| Sept. ... | 98 | 91 | 107 | 89 | 107 | 92 | 93 | 107 |
| Oct. ... | 99 | 92 | 107 | 91 | 108 | 98 | 92 | 107 |
| Nov. ... | 101 | 92 | 110 | 93 | 108 | 100 | 93 | 106 |
| Dec. ... | 103 | 94 | 112 | 92 | 105 | 99 | 88 | 112 |
| 1924 | | | | | | | | |
| Jan. ... | 103 | 93 | 114 | 93 | 108 | 97 | 96 | 114 |
| Feb. ... | 104 | 92 | 115 | 90 | 107 | 97 | 96 | 113 |
| March ... | 102 | 93 | 112 | 88 | 107 | 99 | 93 | 109 |
| April ... | 103 | 95 | 114 | 90 | 108 | 103 | 96 | 111 |
| May ... | 104 | 93 | 115 | 89 | 110 | 104 | 99 | 112 |
| June ... | 103 | 94 | 113 | 91 | 109 | 105 | 98 | 113 |
| July ... | 103 | 93 | 114 | 90 | 110 | 105 | 99 | 112 |
| Aug. ... | 103 | 94 | 112 | 92 | 110 | 103 | 98 | 111 |
| Sept. ... | 103 | 95 | 113 | 93 | 109 | 103 | 99 | 112 |
| Oct. ... | 104 | 96 | 114 | 93 | 109 | 104 | 99 | 113 |
| Nov. ... | 105 | 96 | 116 | 93 | 109 | 104 | 103 | 114 |
| Dec. ... | 105 | 97 | 116 | 92 | 109 | 104 | 98 | 114 |

Indexes of Employment in Cotton Industry compiled from Voluntary Returns of Employers.—Contd.

| Year. | Total. | Spinning | Weaving. | Oldham | Bolton and Leigh. | Preston and Chorley. | Blackburn, Accrington and Darwen. | Burnley, Padiham, Colne and Nelson. |
|-----------|--------|----------|----------|--------|-------------------|----------------------|-----------------------------------|-------------------------------------|
| 1925 | | | | | | | | |
| Jan. ... | 105 | 97 | 115 | 92 | 109 | 103 | 101 | 114 |
| Feb. ... | 105 | 97 | 116 | 91 | 109 | 101 | 102 | 113 |
| March ... | 105 | 96 | 117 | 91 | 109 | 101 | 103 | 114 |
| April ... | 105 | 96 | 117 | 90 | 110 | 103 | 103 | 113 |
| May ... | 105 | 94 | 117 | 91 | 109 | 101 | 103 | 113 |
| June ... | 103 | 93 | 115 | 90 | 106 | 98 | 94 | 112 |
| July ... | 102 | 92 | 113 | 87 | 106 | 100 | 91 | 112 |
| Aug. ... | 102 | 92 | 113 | 88 | 107 | 99 | 90 | 112 |
| Sept. ... | 102 | 91 | 113 | 86 | 107 | 98 | 90 | 111 |
| Oct. ... | 103 | 94 | 115 | 86 | 108 | 104 | 95 | 111 |
| Nov. ... | 104 | 94 | 115 | 84 | 110 | 104 | 96 | 112 |
| Dec. ... | 104 | 94 | 115 | 85 | 110 | 104 | 95 | 112 |
| 1926 | | | | | | | | |
| Jan. ... | 102 | 93 | 112 | 84 | 110 | 94 | 96 | 111 |
| Feb. ... | 102 | 93 | 113 | 83 | 110 | 102 | 96 | 110 |
| March ... | 103 | 92 | 114 | 83 | 110 | 103 | 99 | 111 |
| April ... | 103 | 92 | 115 | 82 | 110 | 103 | 99 | 112 |
| May ... | 98 | 90 | 109 | 80 | 109 | 100 | 91 | 104 |
| June ... | 96 | 86 | 106 | 85 | 110 | 94 | 88 | 101 |
| July ... | 93 | 86 | 99 | 86 | 109 | 93 | 81 | 87 |
| Aug. ... | 95 | 89 | 103 | 88 | 111 | 90 | 80 | 92 |
| Sept. ... | 93 | 88 | 99 | 88 | 106 | 91 | 68 | 99 |
| Oct. ... | 97 | 90 | 105 | 86 | 106 | 97 | 84 | 92 |
| Nov. ... | 99 | 90 | 109 | 88 | 106 | 92 | 80 | 104 |
| Dec. ... | 98 | 91 | 108 | 90 | 107 | 97 | 80 | 105 |
| 1927 | | | | | | | | |
| Jan. ... | 102 | 94 | 113 | 91 | 108 | 98 | 91 | 103 |
| Feb. ... | 101 | 94 | 111 | 92 | 108 | 97 | 91 | 103 |
| March ... | 104 | 96 | 116 | 92 | 109 | 100 | 102 | 107 |
| April ... | 105 | 97 | 118 | 90 | 110 | 103 | 101 | 108 |
| May ... | 105 | 97 | 118 | 92 | 110 | 102 | 105 | 109 |
| June ... | 105 | 98 | 119 | 89 | 110 | 102 | 108 | 108 |
| July ... | 102 | 94 | 117 | 91 | 110 | 103 | 101 | 107 |
| Aug. ... | 103 | 96 | 117 | 93 | 110 | 103 | 102 | 108 |
| Sept. ... | 102 | 95 | 115 | | 110 | 102 | 96 | 107 |
| Oct. ... | | | | | | | | |
| Nov. ... | | | | | | | | |
| Dec. ... | | | | | | | | |

APPENDIX II.

*Monthly Exports of Cotton Piece-Goods from United Kingdom,
1920-1927.*

(000's square yards.)

| Year. | | Year | | Year. | | Year. | |
|-----------|---------|-----------|---------|-----------|---------|-----------|---------|
| 1920 | | 1922 | | 1924 | | 1926 | |
| Jan. ... | 414,757 | Jan. ... | 339,117 | Jan. ... | 353,966 | Jan. ... | 356,097 |
| Feb. ... | 311,989 | Feb. ... | 251,955 | Feb. ... | 397,070 | Feb. ... | 366,410 |
| March ... | 397,139 | March ... | 303,858 | March ... | 353,983 | March ... | 403,250 |
| April ... | 438,818 | April ... | 302,598 | April ... | 377,718 | April ... | 281,778 |
| May ... | 441,251 | May ... | 341,425 | May ... | 394,513 | May ... | 304,214 |
| June ... | 405,844 | June ... | 311,907 | June ... | 346,762 | June ... | 328,211 |
| July ... | 395,200 | July ... | 443,530 | July ... | 383,761 | July ... | 359,611 |
| Aug. ... | 366,541 | Aug. ... | 377,985 | Aug. ... | 373,644 | Aug. ... | 297,933 |
| Sept. ... | 382,139 | Sept. ... | 395,824 | Sept. ... | 359,971 | Sept. ... | 311,686 |
| Oct. ... | 304,912 | Oct. ... | 353,659 | Oct. ... | 364,294 | Oct. ... | 307,745 |
| Nov. ... | 342,923 | Nov. ... | 398,726 | Nov. ... | 329,455 | Nov. ... | 277,640 |
| Dec. ... | 248,046 | Dec. ... | 360,517 | Dec. ... | 409,516 | Dec. ... | 239,776 |
| 1921 | | 1923 | | 1925 | | 1927 | |
| Jan. ... | 249,360 | Jan. ... | 399,988 | Jan. ... | 402,808 | Jan. ... | 322,345 |
| Feb. ... | 244,726 | Feb. ... | 342,554 | Feb. ... | 422,264 | Feb. ... | 298,754 |
| March ... | 231,932 | March ... | 337,412 | March ... | 416,620 | March ... | 393,928 |
| April ... | 186,761 | April ... | 316,279 | April ... | 333,429 | April ... | 316,948 |
| May ... | 145,604 | May ... | 409,963 | May ... | 371,028 | May ... | 413,615 |
| June ... | 152,640 | June ... | 300,669 | June ... | 337,963 | June ... | 330,098 |
| July ... | 177,530 | July ... | 316,084 | July ... | 370,842 | July ... | 336,166 |
| Aug. ... | 212,403 | Aug. ... | 329,946 | Aug. ... | 344,277 | Aug. ... | 362,891 |
| Sept. ... | 265,386 | Sept. ... | 344,319 | Sept. ... | 359,810 | Sept. ... | 335,750 |
| Oct. ... | 342,412 | Oct. ... | 371,290 | Oct. ... | 366,607 | Oct. ... | |
| Nov. ... | 363,633 | Nov. ... | 349,697 | Nov. ... | 325,912 | Nov. ... | |
| Dec. ... | 330,273 | Dec. ... | 323,100 | Dec. ... | 382,185 | Dec. ... | |

APPENDIX III.

*"Margins" between the Prices of Egyptian fully good fair Sakel
Cotton and 60's Cop Twist Yarn, reduced to 1913 values.*

(1913 = 100).

| | 1921. | 1922. | 1923. | 1924. | 1925. | 1926. |
|-----------|-------|-------|-------|-------|-------|-------|
| Jan. ... | 85.7 | 102.6 | 110.4 | 117.4 | 117.5 | 125.3 |
| Feb. ... | 98.0 | 100.4 | 112.7 | 105.6 | 88.2 | 129.9 |
| March ... | 92.8 | 98.8 | 114.2 | 107.3 | 69.7 | 125.3 |
| April ... | 118.3 | 101.7 | 118.2 | 113.2 | 93.0 | 122.8 |
| May ... | 133.5 | 95.8 | 125.4 | 113.1 | 99.5 | 109.4 |
| June ... | 143.9 | 101.5 | 125.9 | 111.1 | 89.7 | 111.7 |
| July ... | 132.1 | 103.1 | 123.5 | 104.6 | 58.9 | 109.1 |
| Aug. ... | 117.2 | 105.8 | 114.3 | 97.5 | 60.4 | 110.5 |
| Sept. ... | 126.6 | 115.0 | 112.4 | 98.7 | 64.6 | 102.5 |
| Oct. ... | 138.8 | 109.8 | 112.5 | 92.5 | 84.1 | 112.1 |
| Nov. ... | 108.4 | 104.7 | 112.8 | 105.4 | 88.0 | 105.1 |
| Dec. ... | 97.2 | 105.9 | 129.9 | 106.9 | 98.6 | 113.9 |

*"Margins" between the Prices of American Middling Cotton and 32's
Cop Twist Yarn, reduced to 1913 values.*

(1913 = 100.)

| | 1921. | 1922. | 1923. | 1924. | 1925. | 1926. |
|-----------|-------|-------|-------|-------|-------|-------|
| Jan. ... | 147.3 | 137.6 | 114.1 | 123.3 | 178.3 | 116.9 |
| Feb. ... | 140.7 | 127.8 | 119.6 | 123.7 | 167.3 | 119.6 |
| March ... | 114.7 | 125.3 | 130.2 | 147.0 | 170.9 | 115.4 |
| April ... | 134.8 | 134.6 | 145.6 | 153.9 | 166.9 | 110.0 |
| May ... | 147.2 | 133.4 | 141.6 | 160.2 | 151.4 | 110.9 |
| June ... | 155.2 | 132.7 | 135.0 | 156.6 | 139.3 | 114.1 |
| July ... | 153.4 | 128.9 | 129.5 | 139.0 | 128.5 | 108.0 |
| Aug. ... | 133.4 | 126.8 | 118.2 | 145.3 | 137.4 | 114.3 |
| Sept. ... | 141.8 | 136.9 | 112.2 | 173.4 | 135.8 | 119.5 |
| Oct. ... | 178.4 | 131.7 | 128.8 | 183.7 | 145.5 | 123.7 |
| Nov. ... | 145.4 | 135.2 | 131.2 | 193.5 | 133.4 | 115.3 |
| Dec. ... | 138.0 | 121.6 | 138.7 | 178.9 | 123.7 | 109.6 |

APPENDIX IV.

*American Cotton : Price "Margins" for a particular case of Superior
Grades of Cotton and Yarn, reduced to 1913 values. (1913 = 100.)*

| Year. | | Year. | | Year. | | Year. | |
|-----------|-----|-----------|-----|-----------|-----|-----------|-----|
| 1921 | | 1923 | | 1925 | | 1927 | |
| Jan. ... | 125 | Jan. ... | 106 | Jan. ... | 139 | Jan. ... | 123 |
| Feb. ... | 138 | Feb. ... | 110 | Feb. ... | 133 | Feb. ... | 126 |
| March ... | 117 | March ... | 118 | March ... | 133 | March ... | 140 |
| April ... | 124 | April ... | 144 | April ... | 125 | April ... | 128 |
| May ... | 126 | May ... | 147 | May ... | 121 | May ... | 130 |
| June ... | 141 | June ... | 144 | June ... | 101 | June ... | 141 |
| July ... | 137 | July ... | 129 | July ... | 99 | July ... | 133 |
| Aug. ... | 126 | Aug. ... | 119 | Aug. ... | 103 | Aug. ... | 131 |
| Sept. ... | 154 | Sept. ... | 123 | Sept. ... | 104 | Sept. ... | 126 |
| Oct. ... | 185 | Oct. ... | 118 | Oct. ... | 106 | Oct. ... | 137 |
| Nov. ... | 169 | Nov. ... | 135 | Nov. ... | 107 | Nov. ... | |
| Dec. ... | 130 | Dec. ... | 145 | Dec. ... | 106 | Dec. ... | |
| 1922 | | 1924 | | 1926 | | | |
| Jan. ... | 130 | Jan. ... | 120 | Jan. ... | 107 | | |
| Feb. ... | 111 | Feb. ... | 123 | Feb. ... | 115 | | |
| March ... | 109 | March ... | 143 | March ... | 117 | | |
| April ... | 110 | April ... | 146 | April ... | 114 | | |
| May ... | 93 | May ... | 144 | May ... | 110 | | |
| June ... | 103 | June ... | 141 | June ... | 125 | | |
| July ... | 99 | July ... | 112 | July ... | 122 | | |
| Aug. ... | 91 | Aug. ... | 136 | Aug. ... | 133 | | |
| Sept. ... | 105 | Sept. ... | 142 | Sept. ... | 139 | | |
| Oct. ... | 126 | Oct. ... | 148 | Oct. ... | 143 | | |
| Nov. ... | 126 | Nov. ... | 130 | Nov. ... | 130 | | |
| Dec. ... | 123 | Dec. ... | 140 | Dec. ... | 129 | | |

DISCUSSION ON THE PAPER.

SIR SYDNEY CHAPMAN : It is a very great pleasure to me to propose a vote of thanks to my old friend Mr. Daniels. It is a very fortunate thing for a University in an industrial centre when one of its Professors of Economics finds his chief interest in the application of his economic knowledge to the great local industry. You have an example in Professor Daniels, an economist thoroughly equipped on the theoretical side, who has made many contributions to the literature of the cotton industry, not only in statistical papers of this character, and economic papers, but also in most interesting contributions to the history of the industry derived from local records. In this paper we have illustrations of Professor Daniels's analytical power and evidence of his detailed knowledge of the industry in the midst of which he has now lived for many years.

I am afraid that I have very little to contribute to the discussion; the paper calls for a good deal of thought before one commits oneself. One of its valuable features is that it definitely establishes certain facts in a scientific way, and the establishing of the facts is by no means the least difficult part in dealing with any particular problem, especially a problem of economics. We all know that the Lancashire industry is badly depressed and has been depressed for a number of years, and we all have a general idea of the sections in which the depression exists, but in place of general ideas such as these, the paper gives definite information. There remains the practical question. With the caution of the scientist, Professor Daniels has, wisely, perhaps, abstained from prophesying about the future. No doubt in the course of discussion to-night the question of what the future has in store will be raised, and differences of opinion may be revealed. The question that all are asking is whether this depression is, as one might say, of the ordinary transitory kind, though intense in degree, or whether it has any special or peculiar features? Those who have watched the history of Lancashire know that these depressions have come and gone in the past—that the industry, after being stagnant for a time and making little profit, has gone ahead again and had a prosperous time till the next check. Is the Lancashire cotton industry going to contract, or become stationary, or will there eventually be further expansion, as there has been in the past? That is the practical question which is in the minds of many. Wisely, perhaps, Professor Daniels has not attempted to answer it; he has given us some of the material necessary to enable us to seek the answer for ourselves.

I was struck by Tables II and III. Table II shows that the world exports of yarn declined materially between 1909-13 and 1923-25. That, I suppose, means that other countries are producing yarn for themselves to a much greater extent than they did previously. Table III, which deals with the export of piece goods, shows a sharp decline in exports from the United Kingdom, and a decline in exports of the whole world. I wonder whether Professor Daniels could tell us the relation between the latter and the variation

in world consumption: what has been that variation and what, approximately, is the world consumption now? Is the depression due to any large extent to a check on world consumption consequent upon the war, for instance, to high prices after the war, and to people having to economize? As to any limitation of world consumption, one might hope that this would not be permanent. In that event, even if countries were manufacturing more for themselves than before, growth in world consumption might more than make up for it. These are questions of no little practical significance. Perhaps Professor Daniels is now considering these and allied questions and the possibility of framing estimates. If so, I hope he will go into them in some future paper. The prosperity of Lancashire in the past has largely depended upon two factors. One is the growth of the world demand for cotton goods. An increase in population in the world and an increase in general well-being are followed at once as a rule by increased demands for cotton goods. The other factor is the degree in which other countries have moved in producing for themselves and sometimes for export also. If the first factor is greater than the second, Lancashire has prospered. It would be illuminating to have the opinion of those who are in the best position to judge as to what is likely to be the relation between those two factors in the future.

In the two or three remaining minutes, I should like to say a few words about the section of the paper which deals with the finance of the industry. So far as I am aware, this is the first attempt to give any comprehensive account of the process of this finance after the war, and consequently that part of the paper seems to me to have a particular value. The task must have been a difficult one, and no doubt the results will be subjected to a good deal of examination and, it may be, to some correction.

There is one interesting point, in connection with this matter of finance of the industry to which I might refer. On page 181 the question is raised whether, in an industry depending very largely on fixed-interest-bearing capital, prices tend to be more or less stable. It is largely a psychological question, but economics is largely psychology. It is suggested on page 181 that such a dependence must have a depressing effect upon prices, because firms being anxious to get anything against the heavy annual charges, scramble for orders more than they would do otherwise. On the face of it that passage might seem to be in conflict with certain other passages in the paper, though, as I read it, the wording gives an appearance of conflict which does not exist in reality. Thus on page 177 Professor Daniels and his colleague say, "Thus a concern so capitalized will in general require a higher margin than a concern capitalized by share capital only, and will have less power to reduce prices." It may have less power in a sense to reduce prices—that is to say, it cannot reduce prices without getting into financial difficulties very soon—but, as is suggested later, it may be in such a position that it is less able to resist a fall in prices. Probably a comparison of those two paragraphs might be worth while, and any conflict of

words be removed. I mention this point merely as an illustration of the number of questions suggested by the paper which will give us much to think about.

I have great pleasure in proposing that a cordial vote of thanks be accorded to Professor Daniels and his colleague for their exhaustive scientific examination in this interesting paper of certain aspects of a question which is one of the greatest practical importance at the present time.

MR. B. ELLINGER: I have the greatest pleasure in seconding the vote of thanks to Professor Daniels for his paper, exhaustive and illuminating as it is. This paper and one which Professor Daniels read last year to the Manchester Statistical Society form some of the most valuable contributions which have been made to the problems which we are now facing in Lancashire, and I join with Sir Sydney Chapman in welcoming the work which our University does and has done for some years in economic investigations connected with our staple trade in Lancashire. In this connection I would like to say that I believe that that work was really started by Sir Sydney Chapman himself at the time he was Professor of Political Economy in Manchester, when he made many valuable contributions to the literature of our cotton trade.

As Professor Daniels comes from Manchester and I come from Manchester, and as two men coming from Manchester seldom agree about the cotton trade, he will, I am sure, be disappointed if I close my remarks without any word of criticism of his paper. My criticism really centres round the title of the paper—"The Post-war Depression in the Lancashire Cotton Industry." This is not a captious criticism or mere debating point, but, I think, something which goes to the root of many of the troubles from which we have recently suffered. Professor Daniels deals with the cotton industry up to page 158 and in one paragraph at the end of his paper, but from page 158 until the end of the paper he deals with the depression in the American cotton-spinning industry, which is by no means the same thing, and has not the same causes, as the depression in the general trade of Lancashire. We export the great bulk of our cotton goods—something like 80 per cent. of them; we import the cotton, mainly from America and Egypt; then it goes to the spinner, and from him to the weaver, and from him to the Manchester merchant's warehouse. From there it goes to the dyers, printers or bleachers, and then goes back to the warehouse, where it is packed and shipped. The general impression conveyed not only to you but even to Lancashire people of recent years, is that because the American spinning trade is in a most deplorable state financially, owing to the causes which Professor Daniels has so exhaustively exposed, that is really the root of our troubles in Lancashire, whereas as a matter of fact it has very little to do with them. The American spinning trade has, for reasons which Professor Daniels has pointed out to you, been losing money for several years, and if it were reorganized financially, and if the capital were written down to

proper dimensions, the losses might be turned into profits, but there would be very little hope that by doing that alone the cost of yarn to the weaver who has to weave it into cloth would be reduced. Unless the product which we manufacture can be laid down in our Eastern markets at a less price than of recent years it will not help us at all that the spinning industry has been re-organized. It will help the banks, the spinning firms, lenders of loans, and shareholders, but not the Lancashire cotton industry as a whole. Our problem is much more deep-seated than that. I have been forty years now in the cotton trade, and all my business life we have been losing the lower end of our trade. We have always been told that it did not matter—Lancashire was going all the time on to finer goods, and could make up at the finer end what was lost at the lower end. That has ceased to be true. During the war the lower end was always the unbleached calico part of the trade, and that trade was going away and being replaced by bleached and dyed and printed goods. To-day the position is that not only have we lost a large part of our unbleached trade, but Japan and other countries have made enormous inroads into our bleached and dyed and printed trade, and if now we have to be driven on to finer and finer goods, we shall only be able to support an industry of much smaller dimensions than the present industry. We shall have to dismantle a great number of spindles and looms. Professor Daniels has shown us that since 1913 our spindles increased by 2 per cent., and looms decreased by 5 per cent., so that, unless we can increase our exports of cotton goods to a point necessitating an increase in looms there will be too many spindles in Lancashire to fill the looms.

Have we to give up hope and make up our minds that our day is finished, and be satisfied to reduce the trade which has existed for so many years in Lancashire? Before we do that we ought to examine—and we have begun to examine—into the methods of our competitors. We are beginning to ask ourselves whether, because we once led the world, the methods by which we did our trade during the last fifty or sixty years are really methods which can compete with more modern methods; whether it would not be wiser to adopt up-to-date methods of producing and trading. I think the Lancashire method of doing its business has altered very little from the time when I entered the business forty years ago. It is a curious method.

We have in Lancashire three big finishing combines: bleachers, calico printers, and printers. They are exceedingly enterprising and exceedingly capable; they have a large knowledge of the requirements of their markets; they and allied bodies fix the prices at which the work shall be done. During all these bad times they have made good profits, and in some cases large profits, in Lancashire. But they are surrounded by hundreds of small firms of manufacturers on the one hand and, on the other, by hundreds of small firms of merchants. They are not allowed to move without the consent of the merchants; they are not allowed to sell any

goods; they can only produce goods sent them by the merchants, and the consequence is that they cannot use to the fullest extent their splendid organization in the way of producing because they are entirely in the hands of the merchants and the overseas customers of the merchants as to when and how and what they should produce.

If you turn to our largest competitor, Japan, the situation is entirely different. There are four firms in Japan which have a capital between them representing thirteen million pounds and a reserve fund of thirteen million pounds; they own their own ginning plants in America and in India and import the raw cotton; they have spinning mills and weaving sheds, and in one or two cases, bleaching, dyeing, and printing plants, and are themselves very largely the exporting merchants to the rest of the world. That is the organization against which we have to compete. Through the multiplicity of our merchants and manufacturers we have created for our trade hundreds or thousands of different standards. The Japanese have adopted modern methods of reducing the number of standards, and have succeeded in reducing them to an enormous extent. If, after examination, we find that there are means of producing as cheaply as Japan produces, by adopting Japanese methods, I think that we can gradually, with the normal growth of the cotton trade in the world, regain our position. But in order to do that we must seriously take in hand the reorganization of our cotton industry. We have in Lancashire a Federation of Spinners, a Federation of Master Weavers, a Federation of Dyers, Bleachers, and Calico Printers, a Merchant Committee at the Chamber of Commerce, and a Shirley Institute, all doing excellent work in scientific investigation. We have an Economic Bureau in connection with the Manchester Chamber of Commerce. All these are excellent bodies, but there is no single body in Lancashire which unifies them; there is no means or body which can call all these gentlemen together and ask them to sit down and consider the trade as a whole. On special occasions, no doubt, the Manchester Chamber of Commerce would do it, but there is no regular means of doing so. When I look at the iron and steel trades and the leather and engineering and chemical industries, etc., I find there is a Federation dealing with each of these trades as a whole. There is no such body in Manchester, but if we had a Federation of that description at the present time I believe it would be one great step forward in beginning to find the solution to our difficulties.

Before I sit down I want to say one word on the ticklish matter of wages reduction. The cost of spinning forms, I suppose, 10—20 per cent. of the total cost of our manufactured goods. Wages form perhaps 8—10 per cent., so that any possible reduction of wages by themselves will not solve the problem. Weaving wages account for 10—20 per cent.—or probably less—of the total cost of our product, so that a reduction in weaving wages alone will not solve our problem. Two years ago the Bank rate fell here 1 per cent. in two months. At that time I calculated that on goods of a certain

class shipped to China, calculating from the time the goods were shipped until a final reimbursement in London, as much difference was made in the cost of the goods by the fall of 1 per cent. in Bank rate as 10 per cent. reduction in workers' wages would have made.

Our freight and distributing charges are too high; our financing, packing, dyeing, printing, and bleaching charges are too high, and it is only by reducing the charges right along the whole line of the chain of production that we can hope to arrive at a result, and a general reduction of wages would not help us nearly as much as if we could go to the operators and point out to them certain lines of trade which we have lost, and then, if other branches of the trade were willing to make sacrifices, ask the operatives to meet us on these special lines in wages or hours or both, I believe that would be a much more fruitful method of regaining our lost trade than a general reduction of wages and general increase of hours.

In Lancashire we are working on out-of-date lists; lists of workers' wages—dyers', bleachers', printers', packers'; lists which are maintained as if they were the laws of the Medes and Persians. They are out of date; nobody dares tackle them; the work of getting them into the present condition was so great that all are frightened of disturbing them, but they are now so out of date that they render us unable to compete in many bulk lines with Italy and Japan.

I have great pleasure in seconding the Vote of Thanks.

MR. J. M. KEYNES said that Professor Daniels's paper raised so many points of interest that he would only select one or two of the more striking. His most remarkable conclusion, if it could be substantiated, was to the effect that the margins in the American section were greater than before the war, and greater than in the Egyptian section, after allowing for changes in prices. On the face of it, that ran counter to almost universal experience, and Mr. Keynes thought that Professor Daniels's results ought to be modified a good deal, because he had corrected his price changes in margins by means of the *Statist* index-number of wholesale prices. It was no good to correct by reference to the *Statist* wholesale index charges which excluded rates, commissions, etc., but were in the main wages and salaries of one kind or another. It was useless to correct changes in wages and salaries by means of the *Statist* wholesale index. The figures of any industry worked out on that basis would disclose very unexpected results. Even if the cost-of-living index-number were used the facts would probably be understated, and the wholesale index-number appeared to bear no proper relation to what was relevant. If, indeed, it were the case that the spinners were getting more than pre-war in the sense that they were getting larger contributions towards increased profit, they would not be in the condition in which they were in to-day.

That miscalculation, if it was one, was perhaps connected with the over-emphasis which Professor Daniels laid on the recapitalization of the industry during the boom point. It was quite clear that

some very imprudent things were done, and the industry had suffered from this boom in many indirect ways. Some of the shrewdest people in the industry had left it. Instead of the industry being owned and controlled largely by people who knew and understood it, a large body of outside shareholders and directors were substituted for them.

Mr. Keynes believed Professor Daniels would have kept nearer to the truth if he had tried to break up the composite figure which a cotton spinner called his "margin." Professor Daniels's conclusion would only follow if, when other items had been subtracted, the balance left for interest and depreciation had gone up more than in proportion to the replacement cost of a new spindle. It was known that that was not the case. To get a rough idea of the order of magnitude, with a normal mill spinning a medium count, if the fixed capital stood at 20s. a spindle, 1d. per lb. would have to be set aside for interest and depreciation; if it stood at £5 a spindle, interest and depreciation would be 5d. If mills were succeeding in getting that 5d. which the boom period presumed, that would be a tremendous factor in the situation. In fact a mill would be lucky if it got 1d., and very few mills got 1d. at the present time. Also, that 1d. only represented interest and depreciation on the pre-war replacement prices of the spindle, whereas to cover to-day's cost a surplus of 2½d. might be needed.

All that part of the paper about the boom period, while very interesting in itself, seemed to Mr. Keynes to have next to no bearing on the main problem under discussion, and it would appear that there were some serious inconsistencies in Professor Daniels's view as to how far the over-capitalization was leading to high prices.

Sir Sydney Chapman had pointed out that on page 177 it was said that high capitalization required high prices. On page 180 Mr. Daniels suggested that the trouble was that the mills were not in a position to cut prices as they should. On the other hand, the truth was very well put forth on page 171, where it was pointed out that the actual capitalization of the mill did not in the least affect earnings and was irrelevant. On page 181 it was pointed out that it was the over-capitalized mills that were the worst as regards price-cutting. The right story was given on page 171 and the wrong story on pages 180-81. Mr. Keynes was a little sorry that Professor Daniels had so much emphasized the financial problem because, although it was a very real one, it had been an obstacle in the way of the education of opinion in Lancashire. Anyone who had lived in Lancashire during the boom period had been so much shocked at what was going on that he was now disposed to attribute a great part of the present troubles of the industry to those past historical events. But if the average of the whole industry, even at the present time, were considered, it would be found that the spindles were not on an average valued at their replacement cost. If the whole of the ordinary capital were written off, the whole of the trouble would not be wiped out; it was necessary to probe

further. Mr. Keynes agreed with almost every word that Mr. Ellinger had said. Mr. Ellinger had published a very important paper showing that spinners were not charging a high price for spinning on world standards, and there was no reason for supposing that they were the real sinners. There were at least three hundred mills of which the aggregate capital was less than that of Messrs. Coats. It was evident that under modern conditions an industry organized in an out-of-date manner would not produce the best results, but the sort of economies that could be got by reorganizing the spinning side by itself could not possibly make enough difference for Lancashire to recapture markets. Something more drastic had to take place, and the difficulty was that it was nobody's business to take the steps, and no one was in a position to do so. Anything that could be any good would upset vested interests in many directions.

There was probably no hall in Manchester large enough to hold all the directors of cotton companies; they ran into thousands. One of the first things should be to dismiss the vast majority of these people, but the persons to whom this proposal would have to be made would be precisely those directors. It might be of benefit to the shareholders, who were otherwise in a hopeless position. If any section of the industry were taken it would be found that a large proportion of those concerned believed that their interests were bound up with the continuance of the present state of affairs, and therefore there was a real risk of nothing being done and the industry going downhill. That was why it was important to try and discover the really weak spots and do something, where it was possible to be practical at all. The cotton industry was not one in which it could be hoped that the ideal course would be taken at present.

So far as the spinners were concerned, Mr. Keynes thought that they had to tackle the problem of over-capacity, and they would also have to form a combine within themselves to make the necessary economies. Outside that there was the problem of the cotton industry as a whole, and how to regain trade. Attention was concentrated on the spinners because they formed the weakest unit, and therefore the losses of the industry as a whole had fallen on them disproportionately. Mr. Keynes would like that weak unit to be made stronger, and if it were made stronger there might be some chances of the other units, no longer able to live on the losses of the spinners, waking up themselves.

PROFESSOR J. H. JONES, who was prevented at the last moment from attending, sent the following written communication, which was read to the meeting by the Hon. Secretary :—

I deeply regret that it is impossible for me to attend to-morrow's meeting of the Society at which the paper prepared by Professor Daniels and Mr. Jewkes will be read. I was extremely anxious to be present, if only to pay my tribute to the past and present work of the Manchester School of Economics. Stanley Jevons was a Professor at Owens College, now the University of Manchester. The

contributions of his successors to economic science and statistics have strengthened the position of the University as one of the chief European centres of economic study and research. The debt of economists and of the community to the previous holders of the Chair, which bears Jevons's name and is now occupied by Professor Daniels, is revealed by the fact that all were in turn invited to occupy posts of even greater responsibility. It will be known that our Honorary Secretary was the Manchester Professor before he entered the Board of Trade, and that he was succeeded by Sir Sydney Chapman. The papers on the depression in the cotton industry previously published by Professor Daniels, and summarized in the first part of the present paper, seem to me to maintain Manchester traditions, and the sample investigations described in the second part, like the sample investigations which Sir Sydney Chapman published before the war, represent a definite and valuable addition to our knowledge of a highly complex industry, the major problems of which are more economic than technical.

I venture, however, to submit a difficulty which I have experienced in reading the authors' interpretation of their material. In the second paragraph of page 167 they state that the depression in the American section has been accompanied by a greater increase in the margin between the cost of material and the price of yarn than in the case of the Egyptian section, and that the difference is due to the fact that the former has to distribute its overheads over a smaller total output and to bear heavier fixed interest charges. A similar point is made on page 177, paragraph three, where they state that the American section could not cut prices to bare prime costs without making many of the firms bankrupt. On page 181, paragraph two, however, they explain the failure of attempts at organization and price control partly by the fact that firms with heavy standing charges, if they were not to be forced into bankruptcy, were compelled to "cut prices which were often far from covering their costs." These statements seem to me contradictory, the last of the three being probably nearer the truth. The aim of a firm is to secure the largest possible margin between the total revenue from sales and the differential costs incurred in producing, differential costs being defined as the difference between the cost of producing and the cost of not producing. Over a lengthy period of depression such differential costs would include fluctuating oncosts, but I cannot see that they would ever include permanent charges in respect of Bank loans negotiated during the post-war boom, or interest on debentures and similar liabilities. It seems to me that it is largely for the reason that the Bank loans were so heavy and the Bank charges had to be met somehow or other that the firms pursued so individual a policy and rejected any form of reorganization in which the benefit would be deferred.

As this difficulty may have presented itself to others, I hope that the readers of the paper will elaborate their point and that in due course I may have the pleasure of reading their explanation in the pages of the *Journal*.

MR. A. W. FLUX said that he would like to see the discussion developed on the broader lines indicated by Mr. Keynes, for he felt it was necessary to probe into the problems of that great trade in Lancashire as thoroughly as possible. It was an encouraging fact—so far as, in the present position, anything could be encouraging—that a bureau for careful study of the facts had been established, and he felt sure the Royal Statistical Society would welcome the association with this new body as a “corporate member” of the Society.

One of the things that struck him most forcibly, and continued to do so whenever his mind was turned to the problems of the cotton trade—as when he heard Mr. Ellinger’s paper before the Statistical Society of Manchester a month or two ago—was that the products of the cotton trade, and of some other textile trades, exchanged to-day for a larger amount of the products of most other trades than they did before the war. So long as the raw fibre stood at a very high price it was possible to cover up the necessity of examining this relatively high value of the products by saying that other charges had moved somewhat similarly. The fall in the cost of the fibre had taken away that means of dodging the real question, and it was necessary to ask oneself if it were probable that Lancashire would maintain its place in the trade of the world on such a basis, and that consumers of its cotton products would be content with terms so much more disadvantageous than before the war. Was not the expansion of the cotton industry in other countries in some sense an indication that they were getting tired, and therefore the necessity arose of finding some way by which the finished cotton goods could be offered for the products of other trades on something like the former terms of exchange?

Mr. Flux said he had intended to deal briefly with some of the admirable sections and figures that Professor Daniels and his colleagues had put forward; he expected to be able to utilize the ideas as to the means of measuring the fluctuations of the cotton industry of Lancashire gathered together in the paper, and felt indebted to its authors for the ideas they had presented, but there were some results put forward as definitely ascertained about which he would like to ask a question.

On page 155 there was a table of world exports of piece goods. It was quoted as having been compiled for the Geneva Economic Conference held in May, 1927, and indicated that, whereas in earlier years the United Kingdom supplied 70 per cent., in later years she supplied only 50·5 per cent. by weight of that export trade. That rather suggested that the figure was of the nature of a guess. It was a rather important thing to make a guess at so large a share. The weight of cotton exports was not registered before the war, and the estimate on which that result was based needed a few words of explanation, so that readers unfamiliar with the source quoted could understand what the table meant. Even if a short appendix should be needed, it would be worth while. Mr. Flux had not had time to refresh his memory by referring to the documents of the Conference, but, as far as he remembered, he was

not quite satisfied with the basis on which the estimate was made, and he thought the exactitude of the measure was not demonstrated.

Referring to another point, in the discussion of the fluctuation of employment as based on figures issued by the Ministry of Labour, criticism was made of the use of the indications of the 1921 census with reference to the proportions of spinning to weaving operatives. The weaving end of the trade was assigned something like 63 per cent. of the total numbers employed in the trade. For 1924, preliminary results of the census of the cotton industry had been issued, in which the whole of the spinning establishments and spinning departments of mixed establishments were taken together as representing the spinning end of the industry. The proportion of weaving operatives to the total was not 63 per cent., or anything like it, and therefore some other standard as to whether or not there was under-representation was clearly needed.

Mr. Flux said that in reference to another comment he would like to make, he thought the authors of the paper were in harmony with him. As he had already pointed out, the voluntary character of the returns utilized by them was a source of weakness in constructing a chain covering a long series of years, as was done in the appendix. He had compared the monthly figures of 1924, covering the whole of the industry in Great Britain, with the index given in the appendix to the paper, and these showed a wider range of fluctuation, and a different type of fluctuation from that shown in the results obtained from the comparatively small sample. The sample of 1924 used for the table in the appendix amounted to only about one-sixth of the total, and its content was known not to be precisely constant from month to month. It provided another illustration of what Mr. Flux personally found himself always running up against—that an attempt to take short cuts by sampling methods was a very dangerous thing when the samples used were obtained from voluntary information secured by the friendly co-operation of manufacturers, since such samples tended to be casual in their very nature and not adequately representative over any considerable period of time. Their use involved a risk of arriving at misleading conclusions. It was vital in such a matter as that under discussion that figures that contained a considerable element of uncertainty should not be treated as definitely ascertained.

THE CHAIRMAN now put the Vote of Thanks to the meeting, and it was carried unanimously.

PROFESSOR DANIELS, replying, said: I should like, in the first place, on behalf of Mr. Jewkes as well as myself, to express our indebtedness for the vote of thanks which has been accorded to us, and especially to Sir Sydney Chapman for so kindly moving it.

To Sir Sydney's questions concerning world exports and world consumption of yarn and cloth we cannot give an exact detailed answer. As pointed out in the paper, however, yarn exports form only a small part of the total production of the United Kingdom, and as the percentage decline in their volume is much smaller than in the case of piece-goods, this decline is only a minor factor in the

depression. According to Table III, world-exports of piece-goods in 1923-25, as compared with 1909-13, show a decline of less than 5 per cent. In so far as these exports can be taken as an indication of world-consumption they would suggest that this consumption is nearly as great as in pre-war days. This suggestion finds further support in the fact that world-consumption of cotton appears to be as great as in pre-war days, also in the information that can be gathered of production and consumption in various countries.* It is not improbable that high prices after the war did impose a check on world-consumption and also caused consumers in large markets to transfer their purchasing-power to cheaper goods than those produced in Lancashire. In pre-war days there was a steady increase in the world-demand for cotton goods, and whatever the world-consumption is now, it is almost certain that it is less than it would have been apart from the effects of the war.

We are obliged to Sir Sydney Chapman, Mr. Keynes, and Professor Jones for pointing out the apparent conflict between two statements in different paragraphs of the paper, and shall endeavour to remove it before the paper appears in its final form.† What we mean by our first statement is that concerns financed by share-capital only can, in a time of stress, sell at prices which just cover prime costs and still remain solvent, whereas concerns largely financed by capital on which, whatever the state of trade, interest must be paid cannot adopt this policy without involving themselves in bankruptcy—to remain solvent they must obtain prices which not only cover prime costs but also the interest charges. The implication of this statement is that the policy of the latter concerns would be to keep up prices. The conflict arises because in the second statement we assert that concerns heavily burdened with interest charges, for that reason tend to cut prices. How this situation may arise can be seen quite clearly if we assume that, with a given level of prices, sales are insufficient to yield the amount of money necessary completely to cover prime costs and interest charges. With an elastic demand a concern which cut its prices and increased its sales might well obtain a larger amount of money than with the higher prices, and so improve its position, although if many or all the concerns adopted the policy the elasticity of demand might be so affected that the position would be made worse. Actually our second statement refers, in particular, to the position when the short-time policy was in operation. The object of this policy was, by restricting output, to raise prices to a point at which concerns with interest charges could maintain a solvent existence. As events have shown, the policy could not completely attain its object for all the concerns. Consequently there was a strong inducement for the more heavily burdened concerns to cut prices in an attempt to improve their position on the lines indicated. In so doing they

* Figures bearing on these points are given in the paper on *The Comparative Position of the Lancashire Cotton Industry and Trade*, mentioned at the beginning of this paper.

† Some changes have been made in the text on pp. 177 and 181 with this object.

played their part along with the better situated concerns in making a continuance of the short-time policy impossible.

Mr. Ellinger has criticized the title of the paper on the grounds that we have dealt mainly with the depression in the American spinning section of the cotton industry, and with the financial position of that section, whereas the depression is much wider and due to other causes than finance. This is valid criticism; in partial answer to it we can only reply that some of the wider aspects of the depression have been dealt with in other papers, and that, as in this paper we have certainly concentrated on one aspect, a narrower title would have been more appropriate. With Mr. Ellinger's observations on the general situation in the cotton industry there is nothing with which we should disagree, but would point out that, in our opinion, the financial problem has been an important factor deferring any serious attempt to face the wider problems to which Mr. Ellinger rightly draws attention. This last remark will also apply to Mr. Keynes's observations on the need for a thorough reorganization of the cotton industry.

With reference to Mr. Keynes's criticism of our treatment of "margins" in the American and Egyptian spinning sections of the industry, we would point out that we have not been concerned so much with the absolute amounts of the margins, as with a comparison between the margins, taking the 1913 margins as the bases of our comparison. Even if the *Statist* index-number is not wholly appropriate, it has been applied to both sets of margins, and therefore should not seriously vitiate comparisons between them. Unless our figures can be disproved it appears that it must be accepted that, between 1921 and 1926, margins in the American section have been greater than in 1913, and also in the Egyptian section, with the exception of the period from the autumn of 1924 to the end of 1925. Moreover, it seems clear that, almost throughout the period, the percentage increase on the 1913 margins in the American section has been greater than the percentage increase on the 1913 margins in the Egyptian section. During the period the Egyptian section has been moderately successful, while the American section has not. Leaving aside many items of cost which are common to both sections, and which there is no reason to believe have increased more for one section than for the other, we are left with the costs in the American section occasioned by short time and increased fixed-interest charges, which in the Egyptian section have been largely avoided. Our contention is, therefore, that the costs so occasioned are an important factor in explaining the difference between the two sections. We are fully aware that these costs are not the sole cause, not even the most important cause, of the present situation in the cotton industry. As mentioned in the paper, we consider that the fundamental cause is the changes in the demand for cotton goods and in their supply in the large markets since 1913. In the paper we have not concerned ourselves with the question of how these changes should be coped with; rather, we have been concerned with a policy which, in our opinion, has been a most serious obstacle to their being coped with by any method which gives hope of success.

In drawing attention to Table III, Mr. Flux makes the important point that, as British cotton exports were not registered by weight before the war, the figures for 1909-13 must be in the nature of a guess, and that consequently the comparison of these figures with those for 1923-25 might be misleading. We understand that the pre-war figures by weight were deduced from the yardage figures by assuming that the relation between weight and yardage of cotton exports had remained constant between 1909 and 1925. To what degree this assumption is incorrect it is not possible to determine. Even if the relation between the weight and yardage of exports of cotton piece-goods from the United Kingdom had changed in this period, it might not make the relative share of the United Kingdom in total world exports incorrect unless changes between the weight and yardage of exports of piece-goods from other countries had been of unequal degree. In an earlier paper* we made an attempt to make similar estimates of the proportion of United Kingdom exports of cotton piece-goods to world exports based wholly upon yardage, and the decline in the share of the United Kingdom is of the same order of magnitude as that revealed by the figures of weight provided by the Geneva Economic Conference, 1927.

It is rather disconcerting to find, as Mr. Flux points out, such a great divergence between the 1921 Population Census and the 1924 Census of Production as regards the proportionate relation between the numbers in the spinning and weaving sections of the industry. We can only suggest that differences in methods of classification and enumeration account for this. If, however, the 1924 figures are more reliable than those published in 1921, the sample provided by the voluntary returns of employers is more suitable than we had imagined. The great obscurity which surrounds the whole of this question will not be abolished until these voluntary returns are obtained from a much higher percentage of the firms in the industry, and collected and classified by the Ministry of Labour in a manner which leaves no doubt of the exact content of the figures in each group of the monthly returns.

Of the weakness in the index of employment, which Mr. Flux points out, we are only too well aware, and we cannot overstress the caution with which it must be used and its ineligibility for use in determining short-term changes. But we consider that for general changes in employment from year to year its correlation with the other indices which bear upon activity in the industry is sufficient to justify the limited and very general conclusions which we have permitted ourselves to base upon it.

As a result of the ballot taken during the meeting, the candidates named below were elected Fellows of the Society:—

Cecil A. Ellis, A S A A

Representatives of Corporate Bodies

Laurence John Cadbury, *representing* Messrs Cadbury Brothers, Ltd
H. G. Hughes, *representing* the Cotton Trade Statistical Bureau

* *The Comparative Position of the Lancashire Cotton Industry and Trade.*

THE VITAL STATISTICS OF WEALTH AND POVERTY

By T. H. C. STEVENSON, C.B.E., M.D.

[Read before the Royal Statistical Society, February 21, 1928,
SIR BERNARD MALLET, K.C.B., in the Chair.]

THE intrinsic interest attaching to comparison of the vital statistics of the more and less prosperous sections of the same community is so great that many attempts have been made to secure it by various methods, but the difficulties involved are also so great that our knowledge on this subject is still singularly defective.

Methods of Comparison Commonly Employed

As the methods which have been used for making such comparisons are doubtless familiar to many of my listeners, a cursory reference to a few of those chiefly employed must suffice. Probably that oftenest used has been the comparison of the returns for the complete populations of localities, as towns, or sections of large cities, selected as representative of riches and poverty. But the very frequency of its use is evidence of the difficulty of such investigations in the present state of statistics in most countries, for it is open to much objection. The samples so secured of wealth and poverty, or culture and the lack of it, are very far from pure. There is a large admixture of poverty in the wealthiest and most fashionable areas, if only in the shape of domestic servants and others employed in ministering to the ease and comfort of the rich; and the poorest quarters are not without their comparatively wealthy classes, such as the publicans and pawnbrokers who abound in such neighbourhoods. The ideal method would classify individuals, and not whole populations, by their degree of prosperity, but in most parts of the world the necessary data are lacking. Possibly now that the veil of secrecy has been withdrawn from income-tax assessments in the U.S.A. we may anticipate a flow of such studies from that quarter, but investigators elsewhere have little reason to hope for any statistics of incomes being made available for the classification of individuals by wealth.

Another difficulty often attaching to the method of locality comparison is that of finding a satisfactory measure of the wealth even of entire localities. It may be obvious that some are rich and some poor; but if they are to be graded by degree of wealth some measure

of precision is required which can make distinctions between areas of similar general type. In England we are without any satisfactory means of doing so. The proportion of domestic servants employed to the total population has often been used for the purpose, but it is probably far from reliable, as local customs and traditions vary, and use is largely regulated by supply as well as by demand, so that it varies with the nature of local industry. Other countries, like France, where taxation returns supply the necessary information, are better situated in this respect, but so long as the rich and poor of entire populations have to be considered *en masse* and contrasted, not with each other, but with similarly mixed material in a population of different general type, the means of measuring the influence of varying degrees of prosperity upon vital statistics must remain quite inadequate to bring out the contrasts actually existing.

The method of grading by size of tenement occupied (number of rooms) is also open to much objection. The wealthy bachelor may occupy no more rooms than the cab-driver with six children. The rooms, indeed, are of different type, but the only feature of rooms ordinarily available for statistical treatment is their number, and by this index the occupants of all three-room tenements are grouped together except in so far as they may be classified by the proportion of the number of occupants to that of rooms. Clearly this index can never provide a satisfactory grading by wealth. And even if it did it would be open to the serious objection that the index used has probably in itself an important influence upon mortality. In examining returns compiled on this basis it would be impossible to say how far the mortality excess of the two- over the four-room class was due to poverty and how far to overcrowding. The present point of view has indeed often been inverted, and the inferiority of the small tenement class assumed to depend entirely upon housing conditions, irrespective of the general effects of the poverty generally implied by small tenements. In either case it is clear that no valid comparisons either of the effects of wealth (or of social or cultural position) or of housing can be based upon distinctions of size of tenement alone.

Relative Influence upon Mortality of Wealth and Culture

To some extent comparisons of vital statistics, such as infant mortality, have recently been compiled in the U.S.A., and possibly elsewhere, with distinction of family income, though such as the writer has happened to see have been on but a small scale of numbers dealt with. So far as this method can be applied it is, of course, ideal for estimation of the effects of wealth as such, apart from its

cultural associations, which are much closer in some instances than in others. But its drawback is that it may fail altogether as an index to culture, probably the more important influence. The power of culture to exert a favourable influence upon mortality, even in the complete absence of wealth, is well illustrated by the case of the clergy. The income test, if it could be applied, would certainly place them well down the list, yet their mortality is remarkably low. Of 178 occupation groups dealt with in the recently published report on occupational mortality in 1921-23, Anglican clergy occupied second place, only one lower total mortality rate (that for farm bailiffs) being returned. Nonconformists came seventh, and Roman Catholics twenty-first. Corresponding positions, stated in the same order, for certain of the chief causes of death are as follows :—phthisis 6, 4, 18; cancer, 2, 1, 16; respiratory diseases, 6, 4, 29; and syphilitic diseases, 8, 7—(*i.e.* no deaths in the latter case).

Such a record as this, consistently repeated in each succeeding report, seems to make it quite clear that the lower mortality of the wealthier classes depends less upon wealth itself than upon the culture, extending to matters of hygiene, generally on the whole associated with it. (Incidentally also it confirms other indications in the same report, that cancer is in large measure preventable, since the hygienic saints of the community escape more lightly than any other single occupation.*) But culture is more easily estimated, as between occupations, than wealth, so the occupational basis of social grading has a wholesome tendency to emphasize it. One does not hesitate to allocate the clergy, despite their unfortunately too frequent poverty, to the highest social class, and similarly in other cases regard can be paid not only to probable income but to cultured intelligence and education. It follows that when one speaks of the more or less comfortable classes one is thinking largely of the more or less cultured classes. I am not,

* The standardized cancer mortality of the clergy, per 1000 of that for all occupied and retired males (occupied only in 1890-92), has been as follows :—1890-92, 80.4; 1900-02, 70.6; 1910-12, 57.7; and 1921-23, 53.0 (Anglicans 52.7, Nonconformists 49.3, and Roman Catholics 72.4). The cancer mortality of clergymen appears to be almost stationary, increase in old age (over 65) being fully balanced by decrease at earlier ages. The last three records of standardized mortality (O.M.F.) for occupied and retired clergymen of all creeds, using the 1901 standard throughout, are as follows :—1900-02, 48, 1910-12, 45, 1921-23, 44. This slight decline, coupled with the large increase of recorded mortality for the total population, has reduced the clergy proportion from 70.6 per cent. of the general rate to 53.0 per cent. in twenty-one years, while the same change had evidently been in progress in the nineteenth century, though the tabulated records do not permit of its exact measurement before 1900-02.

therefore, disposed greatly to envy the Americans their income-tax information, as I believe that the occupational basis of classification, judiciously used, can yield quite as good results as would be obtained by mechanical application of an income standard, which would, I presume, rank the publican, whose mortality is exceeded by only 12 of the 178 groups compared for 1921-23, as the social superior of the clergyman. And in any case I presume that in most countries the statistical material for application of the mere wealth test, at least on a national scale, does not exist. Intensive investigations of sample populations, of which so many are now being conducted in the U.S.A., may provide the material for such gradation by including a question as to income, but the possibilities of this method of enquiry are very limited in scope, and as a means of grading national statistics, statements of the amount of income will seldom be available.

Even if the case were otherwise, any scheme of social classification should take account of culture as well as of wealth. It should also, unlike the results of the special enquiries referred to, be capable of application to the total population, so as to avoid all risk from atypical samples, and to provide the maximum possibility of detailed investigation, which can be secured only by the minute subdivision of very large numbers.

Social Gradation on an Occupational Basis

The method suggested, therefore, as on the whole best meeting the various conditions which have to be considered, is that of inferring social position (largely but by no means exclusively a matter of wealth or poverty, culture also having to be taken into account) from occupation. The census returns provide the necessary data for the whole population, and in most countries occupations tend so much to be hereditary and to be confined to certain sections of society that the broad outlines of social grading can be inferred from them with reasonable safety. We know that the barrister and the blacksmith are in different social grades. In England actual heredity of occupation is chiefly manifested in the cases of agriculturists and coal-miners, but this is not necessary for the purpose in hand, though where it is highly developed, as in Hindustan, deduction of social position from occupation must acquire a singular degree of precision. But all that we require to know for the purposes of the distinction sought is that certain groups of occupations are associated with the culture and (in the higher grades) open to the opportunities, of certain sections of society and not of others. The son of a carpenter may not follow in his father's occupational footsteps, but is at least likely to become an artisan of some sort.

Hence if the occupational groupings used are kept wide enough, their association with social gradation may be expected to be close. Such speculation, however, must be submitted to the test of experience, and the results of such a test are referred to later.

Social grading of the total population on a genuinely occupational basis seems to the writer preferable to the more usual method of selecting certain localities as representative of wealth and poverty for several reasons.

(1) It applies to the total population of the country.

(2) The implication, for the individuals dealt with, of wealth and culture, though naturally far from precise, is free from the gross defects already pointed out as applying to the locality method.

(3) It is also free from the risk of disturbance by environmental circumstances peculiar to the localities compared, which applies to the method of local comparison.

But in order to give the occupational method a fair chance, the classification employed must be genuinely occupational. Before the census of 1921 such a tabulation of the English population was not available for the purpose, and it may be that corresponding tabulations in many other countries suffer from the defects which we have only just succeeded in getting rid of. Our so-called occupational classifications in use at previous censuses were really in large measure industrial, being based not entirely upon the nature of the work performed by the individual, but in many cases upon the nature of the employer's business. Thus we distinguished carpenters and clerks—occupational groups from which social position and degree of wealth can be broadly inferred—but we also distinguished as occupations the manufacture of many articles such as motor-cars and bedsteads. So-called "occupations" of this nature indicate neither the nature of the work performed nor the social position of the worker, as such groups include both large employers and the humblest members of their staffs. The British census of 1921 avoided such confusion by providing separate tabulations by occupation and by industry, and it is the use of the former which is advocated as a means of social grading.

Description of Scheme Suggested

No attempt has been made at anything beyond the broadest and simplest lines of social grading, but it has been found that these suffice to bring out many new and some totally unexpected facts. Five social grades are used, as follows :—1, upper and middle classes; 2, intermediate between 1 and 3; 3, skilled workmen; 4, intermediate between 3 and 5; and 5, unskilled labourers. Class 2 includes occupations membership of which may or may not imply

Class 1 status, Class 4 holding the same position as regards Class 3. Classes 1, 3 and 5 are clearly defined so far as the occupations actually assigned to them are concerned, for the scheme implies that all doubtful cases are assigned to Classes 2 and 4, 2 covering the debatable ground between 1 and 3, and 4 that between 3 and 5. Of course there must be many men included in both 2 and 4 who might appropriately be assigned to the class above or below if all the facts were known, and they could be dealt with as individuals, but in this case occupations have to be dealt with as a whole, and no fact relevant to the social position of the individual except his occupation can be taken into account. The scheme is admittedly a rough-and-ready one, as indeed all broad lines of classification devoid of quantitative basis must be, but it has the great merit of simplicity, and the results of its application, which are published in the recently issued report on occupational vital statistics, seem to me to point to its fundamental soundness.

Evidence as to the Degree of Success Attained

Naturally the assignment of each of the census occupations to one or other of five social classes is largely empirical, and it is unlikely that any two framers of such a classification would be in complete agreement as to all its details. The test of success must be furnished by the results achieved. The scheme under discussion has yielded natality (1921) and mortality (1921-23) rates varying regularly with social status, from a minimum for the highest class (1) to a maximum for the lowest (5). Taking the rate for all classes jointly as 100 in each case, natality (births per 1000 married males under 55) varies as follows from Class 1 to Class 5—70, 74, 101, 116, 127; and mortality as follows:—81, 94, 95, 101, 126. There are thus no exceptions to the rule of increase with descent of the social scale, though the increments are far from uniform. The causes of some of these differences are known, and will be referred to. Corresponding ratios for infant mortality, which is notoriously sensitive to hygienic and social conditions, are 48, 70, 97, 113, 123.

There is nothing new in the idea that mortality and natality are higher in the lower than in the upper social grades. It is indeed so well established, and confirmed by so much evidence of various kinds, that its truth may be assumed. It seems then to follow that as low social status is a factor in high mortality, mortality should tend to rise as status falls in a case such as that under consideration, where other factors influencing mortality, such as sex, race and climate, are substantially similar for all classes. If there were complete similarity of these other factors, variation of mortality would be due only to social status, and the death-rates of the five

classes would vary strictly in accordance with it. An exception to this condition of similarity of other factors, in the shape of disproportionate enjoyment of the benefits to health of rural conditions of life and work by Class 4, which includes agricultural labourers, has brought the death-rate of this class much nearer that of Class 3 than of Class 5. This is especially noticeable for phthisis and cancer, the cancer rate for Class 4 being actually lower than that for Class 3, though exclusion of agricultural labourers increases it to its appropriate place in a series of regularly graded cancer mortalities.

So far as mortality conditions other than social status can be assumed similar for all classes, then, regularity of mortality grading would seem to provide a test of the success of the social grading employed, for mortality varying as between classes with social status alone should vary regularly if the social grading were regular, which is, of course, the ideal aimed at. The chief departure from such regularity, other than that already dealt with, is approximation between the total mortality rates for Classes 2 and 3, but as the natality rate for 2 approximates to that for 1 (so diverging from regularity in the opposite direction), it may be that the social classification is not at fault, but that some as yet unrecognized factor other than social status operates so as to approximate the rates for Classes 2 and 3. This feature is not adequately brought out by Diag. 2 of the report, being much more evident in Diag. 3, but the former shows, by contrast with the corresponding results (for all causes of death, phthisis, cancer, and bronchitis respectively) in 1910-12, how much more regularly graded is the mortality of 1921-23, presumably as the result of improvement in the social classification employed. For this improvement there are two main reasons: (1) the more truly occupational nature of the census classification, already referred to, and (2) better allocation of occupations to social classes as the result of experience with the first social classification (1911), and of increased care consequent upon increased realization of the importance of the subject.

But I would go so far as to suggest that the results now discussed not only prove that the social classification employed is substantially correct on the assumption of correlation of high mortality with low social status, but that, paradoxical as it may sound, they are at the same time an indication both of success in the social grading of the population and of the association of mortality with low status. For if either of these two propositions were untrue, the gradations of mortality indicated in the tables and diagrams of the report could not occur. If the social classification used were without validity there would be no reason for correspondence with mortality. A chaotic grouping of the population would be as likely to exhibit high

or low mortality in one section as in another. And, on the other hand, if there were no association between poverty (much more closely associated with low social status than wealth with its opposite) and mortality, the gradation of mortality by occupationally distinguished sections of society would be inexplicable. It would be necessary to assume that while aiming at a social classification of society (unsuccessfully, because the positive association of mortality, where none really existed, with supposed social status would prove that the social classification, producing such an illusion of association, must be altogether bad) we had, in fact, accidentally stumbled upon a classification by some other criterion closely associated with mortality. This, of course, is so unlikely that the possibility of such an occurrence may be disregarded, and we are left, as far as I can see, in the position that to explain the facts as tabulated we have to assume both that the social classification is on generally sound lines and that mortality is associated with low social status. If either proposition were untrue the recorded facts would be inexplicable.

Instances of Social Gradation of Various Forms of Mortality

If the above considerations justify regularity of social grading of mortality being regarded as evidence of the success of the social classification employed, such evidence is provided in abundance by the social comparisons for mortality from particular causes charted in Diag. 3 of the report. The following forms of mortality show uninterrupted increase, as a rule at separate ages as well as at all jointly, from a Class 1 minimum to a Class 5 maximum—phthisis, syphilis and its consequences, valvular disease of the heart, bronchitis, pneumonia, respiratory diseases as a whole, and peptic ulcer; while in one or two cases the gradation is reversed, mortality increasing with social status. This applies without qualification to appendicitis, which is thus seen, in contrast to peptic ulcer, to be a disease of wealth, and in the main also to diabetes. Mortality from digestive diseases in general is at a maximum in Class I, the poor not being subject to the temptations of the rich so far as food is concerned, and it is especially interesting to note that the "diabetes" of later life, whether properly so called or not, which is known to be closely associated with over-eating, is very highly graded from a Class 1 maximum to a Class 5 minimum, excess for Class 1 over Class 5 at 65-70 being no less than 471 per cent., whereas at ages under 45, when intemperance in food is not an important cause, mortality is much alike for all classes, its constitutional origin at these ages applying, apparently, to all classes indifferently.

The distribution of cancer mortality is very interesting, for when these deaths are classified by the part of the body involved it proves

that cancers of certain sites (cancer of the stomach in males, who alone are dealt with) for about half the total mortality, are highly graded in the usual direction, from 58 per cent. of average for Class 1 to 1.40 for Class 5, whereas there is no significant social variation for the remaining sites. The graded group includes the alimentary canal from mouth to stomach inclusive, gradation ceasing abruptly at the pylorus, the larynx, and the skin. It would therefore appear that cancer of these sites is largely preventable, though the factors determining its differential incidence will have first to be recognized and remedied.

All this evidence, I think, goes to show that the social distinctions have been successfully drawn, and that they profoundly influence mortality as well as fertility. If this be granted we can reverse the argument, as above, and proceed from assumption of the correctness of the social distinctions made to examine the social distribution of mortality from various causes, as is done in the report.

Applications of Social Classification

It may be of interest to consider some possible further applications of this social gradation of the population.

1. In Regional Comparisons

It often happens that in making comparisons between sections of the population to bring out the influence of some one factor, such as geographical situation, upon their vital statistics, generally of mortality, we should prefer to compare like with like occupationally, in order, by limiting differences as far as possible to the effects of the variable under consideration, to come as near as may be to the measurement of these effects unprejudiced by other influences, such as that of occupation. Sir Alfred Watson has pointed out, in comment upon his recently published life-tables for sections of the English population in 1920-22, that it is desirable, in making such comparisons of sectional mortality, to survey concurrently the effects of three principal factors influencing it—geographical distribution, density of population, and occupation. The combination of the first two of these three at least is essential if local differences are to possess any definite significance, and for this reason the death returns for each administrative county have from 1911 onwards been published annually in two sections, for the aggregates of urban and of rural districts respectively within the county. We can much more legitimately compare the urban and rural mortalities respectively of Hereford and Middlesex than their total mortalities, which under similar sanitary conditions should be lower for Hereford on account of its rural character and the urban character of Middlesex. But if

allowance is to be made for these differences, the census as well as the registration tabulation must be so framed as to facilitate them.

The problem, however, of taking differences of occupation into account simultaneously with those of geographical situation and urbanization is not easy of solution. Even the largest occupation groups in the census classification, such as coal-miners, clerks, or agricultural labourers, are of such a size that if divided simultaneously by situation (in any degree of detail) and by urbanization the numbers available for comparison, after the indispensable further subdivision by age, would frequently be insufficient to yield significant results. The compiler of statistics is indeed constantly faced by the difficulty that his returns will not bear the degree of subdivision theoretically desirable. If there is to be expansion in one direction there must, generally speaking, be compensating condensation in another. It is possible, for instance, to deal in far greater detail with the returns for ten years than with those for one, and if occupational data are to bear subdivision on the scale suggested by Sir A. Watson's proposal, the occupational groups must be very large.

2. When Regional Distinctions affect Social Comparison

There may indeed be other circumstances than those referred to by Sir A. Watson calling for tabulation by occupation and geographical situation, just as if not also by urbanization. The social classification itself may be affected by regional considerations. The mortality of certain occupations, *e.g.* textile workers, is presumably higher than it otherwise would be because of their localization in relatively unhealthy parts of the country. In strict accuracy, therefore, it may be argued that the mortality of a social class of which textile workers form a considerable proportion should be compared with that of other classes similarly handicapped by geographical situation. This could be done, of course, by confining comparison to sections of the country. But such a proceeding would again be possible only for very large social groups, such as the five employed. I am inclined to doubt, however, whether such regional segregation, even of large occupations, can have much practical influence upon an extremely coarse social grouping applied to the whole population of England and Wales. But the point is one to be borne in mind. It emerged in the case of one comparison made in the occupational mortality report. It was desired to compare the records of quarriers and masons working in sandstone with those of others working non-siliceous stone. For this purpose certain counties were selected to form an area where sandstone chiefly is worked. But these happened all to be in the North of England, and

as silica risk is largely risk of respiratory disease, mortality from which is in great excess in the North generally, it was impossible to say how much of the large sandstone mortality excess found was due to silica and how much to the geographical factor. But while this may be of importance in the case of a single localized occupation it is much less likely to apply seriously to the broad social classification.

3. In Detailed Investigations of Causes of Mortality

But this is not the only advantage of its breadth. This feature renders it possible of application to many purposes, in addition to regional comparison, for which the census groups would be impossibly small. An instance of this occurred in the preparation of the recently published report on occupational mortality. It was desired to ascertain the relation of occupation to cancer of various parts of the body, in continuation of the study of this subject undertaken ten years previously by the Medical Research Council. But naturally comparisons of cancer mortality make the universal demand for subdivision of the data by age in very special degree, and it seemed that, as the sequel proved, very considerable detail by site of growth was also required. There appeared only one way to satisfy these competing requirements. Detail of occupation must be sacrificed, and it was. Except for three of the most important sites, which are dealt with by single occupation groups in Appendix D of the report, occupational differentiation was restricted (in Table 4) to the five great groups of occupations constituting the social classes. Yet this sufficed to bring out some totally unexpected and even surprising facts, the significance of which it remains for the future to determine. Detail of site of growth only became a practical possibility when detail of occupation was sacrificed, and it must often be so. Possibly, indeed, a good fairy could endow a statistician with no gift of greater value than judgment in the appropriate grouping of his data. I am convinced that much important knowledge is lost for want of this.

I shall conclude with one further suggestion of a possible utilization of the extremely coarse occupational classification described.

4. In Comparisons of the Natural Increase of Social Classes

The persistence and acceleration of the fall in the birth-rate has of late given added interest to the question of the relative extent to which the various sections of society are effectively reproducing themselves. There is, of course, no doubt whatever, as the natality ratios above quoted show, that reproduction is much less active in the higher levels of the social structure than the lower, but so also

is the need for it much less to repair wastage, owing to the much lower mortality experienced throughout the whole of life. If, therefore, we are to ascertain the extent to which various sections of the community, social or occupational, are holding their ground, or tending to relative increase or decrease of the existing stock, decrease involving, of course, maintenance of numbers at the level prescribed by requirements and opportunity by means of recruitment from other stocks, a balance must be struck for each section of society dealt with between mortality and natality. Unfortunately the available published figures are not suitable for the purpose, owing to the fact that the natality rates for occupations and social classes make no adequate allowance for differences in age between their members. The figures quoted above, which show the fertility of unskilled labourers as almost double that of the middle classes, are perhaps not quite fair to the latter. For in their case the proportion of elderly men is much larger than in the other for two reasons—(1) more of them survive to later life, and (2) admission to the occupations concerned, especially the professions, is only secured, as a rule, by adults. For this reason the average age of the wife must be considerably greater in Class I than in Class V and therefore her potential fertility less. This disadvantage of Class I would be much greater than it is but for the limitation of the men taken into account to those under 55 years of age, as otherwise the large proportion of Class I veterans of ages at which few men beget children would further depress the fertility shown for this class to a truly alarming extent.

It would, therefore, be misleading to estimate the "natural increase" (positive or negative) of the social classes by simply deducting mortality from fertility, as we do when dealing with the total population. Some means is required by which to overcome the difficulty considered, and also to take into account deaths at ages under 16, at which our returns of occupational mortality commence. Death certification in its present form provides the means of overcoming the latter difficulty. We already tabulate infant mortality by the occupation of the father, and the information on the certificate suffices to extend this to age 16, at which the present returns would take up the tale and carry on the record of mortality for each class throughout the whole of life, the record thus extending from the cradle to the grave. We could thus obtain a life-table population for each social class or large occupation dealt with.

But when this is done we only have the record of wastage. It requires to be supplemented by a corresponding record of replenishment if a balance is to be struck recording growth: And since reproduction varies with age, and the age distributions of the life-

table populations compared will vary greatly, we require the appropriate natality records applicable to each age in each case.

These are not provided by our present natality registration in this country, though they are easily obtainable, and are, in fact, obtained in many other countries. All that is required is an entry, on each birth certificate, of the ages of the parents at the time, as was provided for in the original Scottish Registration Act of 1854, but discontinued after the experience of a single year—1855. With this information it would become a matter of simple straightforward tabulation to record the numbers of births to married men of any occupation, or social class aggregated from occupations, with distinction of sex of child and age of father. (For present purposes the age of the mother, important in other connections, may be ignored, and legitimate births alone can be taken into account.) Relation of these numbers to the census records of total males of various ages in the same occupations or classes would provide natality rates applicable to the corresponding life-table populations.

One could then start with 100,000 sons of carpenters, etc., at birth, and trace their wastage age by age through life, assuming them to become carpenters in turn. The natality records would provide the corresponding information of replenishment age by age, and we could thus find how many potential carpenters of the second generation would succeed 100,000 of the first, and at the same time the average length of a carpenter generation. With this information for social classes and for occupations or occupation groups of sufficient importance to warrant such treatment, the question of relative increase in various sections of society would surely be easily settled.

It may at first sight seem somewhat arbitrary to propose to leave females out of account in these calculations. But in reality they are not being left out of account, for nature has so arranged matters that the potential (legitimate) fertility of husbands is determined almost entirely by the ages of their wives. Miners, marrying young wives, tend to have large families on this account (though not on this account alone), and the effect of the wife's age will be expressed in the natality record of the husband. It has always in practice been found necessary to confine records of occupational mortality to the male sex, for reasons discussed on page vii of the recently issued Decennial Supplement, Part II, though a proposal for inclusion of females in the records of social mortality distribution is there made. These reasons obviously apply with equal force to the tabulation here proposed, but the record for the male will automatically take account of the mortality as well as of the fertility of the female. So long as a man remains a widower he cannot beget legitimate children.

One advantage which may be claimed for this scheme is its great simplicity. It takes no account either of females or of marriages, both of which factors are fully allowed for automatically.

For the object of enquiry proposed is not the fertility of marriage in various sections of society, but the much more fundamental consideration of the extent of increase or decrease in these sections. From this point of view it is a matter of indifference whether a man avoids paternity by refraining from marriage or by measures taken after marriage. All that counts is whether, and to what extent, he is reproducing his kind. A complete measure of this should, of course, take account of all births, but our present information does not provide the means of classifying illegitimate births by the occupation of the father, which is not always on record, and in any case the matter is not of much importance for a country where illegitimate births form only about 4 per cent. of the whole. It may be anticipated also that the operation of the recent Act for legitimizing children on the marriage of their parents will provide information as to the paternity of a rapidly increasing proportion of infants born out of wedlock, who can thus be taken into consideration in the proposed tables.

It may be anticipated that such tables as these would in time provide a much more efficient substitute for census tabulation, as in 1911, of the fertility of marriage. The census tables depend upon the memory of the public for long-past events, while the tables now proposed would be based on official records of events registered as they occur. But the chief advantage of reliance on registration in preference to census records is that it would permit of age being taken into account. The fertility records of 1911 included neither the ages of parents when their children were born nor the ages of the children at death, but both would be obtainable from the registration records, the latter presumably, up to the time of life at which personal replaces parental occupation as a factor in mortality. Lack of this knowledge of the vital factor of age was a constant cause of embarrassment and difficulty to the writer in reporting upon the results of the 1911 tabulation, as well as of indefiniteness and inconclusiveness in the results arrived at, and he is therefore very strongly of the opinion that the method of the future for dealing with such matters is to be derived from the records of birth and death registration, related, naturally, to census records of population. But of course one advantage of the census over the registration method is its retrospective capacity, and as by 1931 the latest information on the subject will be twenty years out of date, there will be a strong case for repetition of the fertility enquiry in, at least, that census. The registration method can then take up the task more efficiently for the future.

DISCUSSION ON DR. STEVENSON'S PAPER.

PROFESSOR GREENWOOD : I think the compliment that Dr. Stevenson would most value would be for one to say that his work is entirely in the spirit of Farr, and that compliment has the advantage over many compliments that it happens to be literally true. Thanks to Dr. Stevenson, the occupational mortality records of this country continue to be the most satisfactory available for any European nation, and I think those of us who are familiar with Farr's writings—and I take it that is the majority of those present—will agree that there is a good deal, particularly in the concluding paragraphs of Dr. Stevenson's paper, that is in the philosophical, enquiring spirit of Farr himself.

In moving a Vote of Thanks to Dr. Stevenson I shall follow our settled practice of dealing not with the very numerous points in this paper which cannot be assailed, but rather referring to some points upon which it seems to me there might be a certain amount of difference of opinion. So far as I can judge, such controversy would be very largely verbal, but I think in this subject verbalisms may be quite important.

I mean, for instance, that it is a little unfortunate that words like "wealth" and "culture," which are used frequently in one sense, are used by Dr. Stevenson in a rather different sense; his meanings are always clear from his context, and they are different from the ordinary everyday-life implications of the words. I think Dr. Stevenson means by "wealth" the purchasing power of the family unit, and by "culture," not an acquaintance with differential equations or the minor poems of Horace, but a combination of knowledge and skill which enables a person to use his purchasing power wisely. It seems to me that now and then Dr. Stevenson is forcing an open door. Surely all agree that as one increases the purchasing power of a group one does not decrease its mean rate of mortality to zero; and again, it seems to me that it is in the nature of a truism to say that given a certain purchasing power, the use of that purchasing power varies greatly with the innate capacity and the education of the individual. The only cases with which I am acquainted where wealth, in Dr. Stevenson's sense, is the overriding factor are the cases that, for example, such statisticians as Mr. Rowntree and Professor Bowley have investigated in their York and Reading enquiries. In any community such as ours there does exist a group of persons whose purchasing power is so small that no amount of culture in Dr. Stevenson's sense could possibly enable them to provide adequately for the family unit; the problem has turned upon the definition of such a minimum standard, and the estimation of the numbers of persons who *must* fall below it.

I suppose if we were in the ideal world of the statistician, where everything can be accurately measured and expressed upon a quantitative scale, we should be able to express the rate of mortality as a function of n different variables, of which purchasing power and

culture would be two. If we were in not quite so ideal a state, but possibly in a country organized with American money, in which it was possible to measure purchasing power accurately, and to measure culture accurately, then we should discover, if we estimate the rate of mortality from a knowledge of the other measures, *i.e.* if we assume that the rate may be put equal to $f(x, y)$, where x is the measure of wealth and y of culture, that when x fell below a certain minimum, very large variations in y would make no appreciable difference to the value of $f(x, y)$, and when the measure of x passed above a certain value, very large variations in x , would be relatively unimportant as compared with variations of y . I do not clearly see any evidence presented here which entitles one to say that if one had to choose between a measure of family income, as suggested by the Americans, and a grading of population on Dr. Stevenson's system, that the latter is necessarily a better measure of mortality than the other. Can we, on the average, predict the mortality rate of a group better from a measure of the mean income or from a measure of the mean culture? I do not think the question can be answered. Although I agree with a great deal that Dr. Stevenson has said about the success of his social classification, I see an objection to the argument that the classification is good because it does correspond closely to the order of rates of mortality. If one ranked the rates of mortality of the 178 occupations from the highest to the lowest, the occupations would then give the best arrangement in one sense of the word. If someone were to do that, and were then to argue that the groupings so obtained were the best groupings because they agreed perfectly with the mortality rates, he would be correct. Incidentally, that was the practice of the Registrar General's Office in the past in constructing Life Tables of "healthy" districts; healthy districts were those in which the death-rate was below a certain maximum. It might be argued that the resulting geographical classification was successful, as, indeed, it was.

I do not quite like the unrestricted use of the word "preventable" in such a passage as: "incidentally it also confirms every observation in the same report that cancer is in large measure preventable." That statement is, I think, true, but it would not have been less true if the concluding words had run: "that cancer, like bronchitis, phthisis and a majority of killing diseases, but not to so high a degree, is a preventable disease." I think there is a risk that the general reader might conclude that cancer is *more* "preventable" than other diseases. I should like to express again, before sitting down, the admiration that we all feel for the magnificent work that Dr. Stevenson has done on our occupational data. I beg to move a very hearty Vote of Thanks to him for his paper.

SIR WILLIAM HAMER: I am sure we have all greatly enjoyed this paper. I was particularly interested in that section of it which has aroused the Proposer's criticism, for I do think the question of "culture" is an important one. As to the beneficial effect, of

even homœopathic doses of culture, in reducing mortality, there can, of course, be no doubt whatever—witness the 60 per cent. decline, during the last fifty years, in infant mortality, which the late Dr. Wheatley of Shropshire told us was, in the main, due to the passing of the Elementary Education Act of 1870. The influence of culture goes, however, even further than that. Speaking as a student of epidemics, I was particularly interested in the point Dr. Stevenson has raised, because it calls to mind an old controversy in epidemiology—the question as to why the well-to-do suffer from certain forms of epidemic disease to a much greater extent than the poor. Fracastor discusses this question in connection with his “fever with spots like flea-bites,” and he considers various reasons as to why it should be so. Creighton says that Fanois mentioned similar occurrences in the epidemic in Holland in 1669, cases in which it was noticed that the wealthy suffered more than the poor. Creighton refers, moreover, to the same phenomenon in the “typhus” epidemic in 1623–4, when the nobles and squires suffered from the disease to a greater extent than the poor. Sir George Newman’s description of the “setting” of influenza epidemics in the midst of cerebro-spinal and other fevers, again attracts attention to the fact that influenza tends especially to affect the nervous system, and when epidemiologists found themselves face to face with the after-effects of encephalitis lethargica, they became particularly interested in the problem presented by the relationships between influenza and various prevalences of nervous disease. The opinion, moreover, was not uncommonly expressed that even insanity not infrequently followed upon influenza. It was realized that the statistics of insanity are by no means easy to handle, and at length it struck me that it might be wiser to begin, so to speak, at the other end of the scale, and instead of trying to study the relationships between influenza and mental diseases, to tackle the evidence as to the influence upon men of repeated attacks of influenza. On making preliminary attempts to study the subject, I found there was a suggestion of correspondence between excessive mortality affecting men of genius and years of marked influenza prevalence.

I do not know that I feel quite so bold as to go as far as Dr. Stevenson does in his paper and suggest that certain results obtained not only prove that the method of grading adopted in making the analysis is a reliable one, but that these same results also really indicate the existence of a correlation between certain high mortalities and high social standing. The subject, however, seems to deserve further study, and I feel honoured in being asked to second the Vote of Thanks for such an interesting paper.

SIR ALFRED WATSON said it was obviously a great pleasure to all to join in the Vote of Thanks which had been moved to Dr. Stevenson for his admirable paper. He, personally, had found Dr. Stevenson’s paper of intense interest. There were, of course, as Dr. Greenwood had shown, various points, more or less of a verbal character, on which Dr. Stevenson’s classification could be criticized,

but he regarded the paper nevertheless as truly answering to the definition of research work, and he felt sure that all who had to do with problems arising on questions of mortality—whether medical or actuarial—must be grateful to Dr. Stevenson for the new light which he had thrown on some of the matters that had puzzled them for a long time past.

If he might make one point in the nature of a criticism, Dr. Stevenson had laid great stress upon the effect of the inclusion in a particular class of the group of agricultural labourers, and that seemed to be significant, because if the agricultural labourers had their own special rate of mortality, their inclusion (and they were a large group) in a particular class must have an influence upon the death-rate of that class corresponding very closely with the proportion of the group of agricultural workers to the total of the class. And if, for instance, the depopulation of the rural districts had not been proceeding, as it had been for the last thirty or forty years, and if the group of agricultural workers, being much larger, had retained their own special mortality experience which Dr. Stevenson had shown, their inclusion in Class IV might have brought out, not a rate of mortality slightly higher than that of Class III, but one materially lower; such a result would, he thought, have given Dr. Stevenson cause to ponder.

Sir Alfred was afraid it was a fact that if they wanted to analyze mortality with reference to occupation and other specific elements, they must do a great deal more segregation, and they must face those particular difficulties to which Dr. Stevenson had referred when he said that to proceed to the ultimate stage of any desired analysis would reduce the facts to such a small volume that the results brought out would be devoid, on that account alone, of any authority. He thought that these difficulties would have to be faced, and that if one wanted to proceed further on the lines of the most interesting social classification proposed by Dr. Stevenson in his latest report, it would be necessary to go deeper and separate more, even if the result was to reduce the facts in some of the divisions to quantities which would be regarded as undesirably small.

For his own part, Sir Alfred said, he very much wanted to have material from which to construct a table of mortality applicable to the industrial population, and he would point out, in that connection, that the industrial classes included the agricultural workers, whose mortality experience might not be analogous to that which, in Dr. Stevenson's investigation, was called Class IV. The particular purpose he (Sir Alfred) wanted to serve was the great system of social insurance that had been inaugurated in this country. Social insurance involved finance, and in order to get a proper equation between the contribution exacted from the worker and his employer, and the benefit to the worker given in return, it was advisable that they should learn a good deal more than was known at present about the rates of mortality among the workers, their natality rates, the proportions of married men among them at different periods of life, the relative ages of wives, and factors of that kind, so that whether

the subject of enquiry was health insurance or pensions, it would be possible to get nearer to the incidence of the cost of the scheme than was possible with the material at present available in the returns as to the whole population issued by the General Register Office.

Sir Alfred hoped that investigations such as those now started by Dr. Stevenson would be so developed as to serve these and other actuarial purposes, and in that connection he would like to ask Dr. Stevenson whether it would not be possible to give the figures in quinary groups instead of in groups of ten years such as ran through his latest reports? He knew, of course, that Dr. Stevenson deprecated the throwing of all results of mortality investigations into Life Table form, but the Life Table form had its uses; it certainly had for such purposes as the regulation of the finance of National Health Insurance, and it also had its uses in conveying to the mind of the average student, with a certain clarity, facts which were comprehended with more difficulty when they were exhibited in the form of mortality rates covering broad age-groups.

Sir Alfred said there was not time to go at length into that aspect of the matter, in regard to which he would dearly like to break a lance with Dr. Stevenson, he would have to content himself by asking whether, inasmuch as the results of the investigations Dr. Stevenson had made into occupational mortality were bound to be of great value for social insurance, it was possible to hope that on the next occasion a greater subdivision of the data would be made, with reference to age and perhaps to other factors, than was possible on the last occasion?

DR. PERCY STOCKS said he was very much pleased to add his appreciation of the very valuable paper to which they had listened from Dr. Stevenson, and also of the Decennial Supplement on which the paper was based. He was perhaps unusually interested in the Supplement owing to the following coincidence. He was just writing the last line of a paper on Infant Mortality Rates in which he was attempting to correct the infant mortality of certain areas for differences in the occupational make-up of their populations, making use of the only material then available (the Occupational Distribution used in the 1911 Census and Fertility Reports), when the new Supplement descended upon his desk like a bolt from the blue. After turning over a few pages he realized that the agonies through which he had passed in trying to make agreement between three separate tabular arrangements used in the 1911 Reports might have been saved, and that he could never again sleep soundly until the work had been gone over all again with the new data. He did not, of course, suggest that such experiences were unusual to anyone who did research in statistics.

Dr. Stocks certainly agreed with the conclusion Dr. Stevenson had reached in the paper as to the much greater usefulness of the new classification than of any that had preceded it, at any rate from the theoretical point of view. His only quarrel with it was as a practical statistician. In order to apply it for the purpose of

correcting mortality rates, for example, one was faced with the necessity of standardizing by about six hundred groups. The reason for that was that a division into the thirty-one major occupational groups took one very little of the way towards separating social classes. Most of the larger divisions were still made up of sub-groups which ranged from the employers at the top down to the humblest workers in that particular branch of industry. He admitted that the classification into five social classes was also made in the tables of the Decennial Supplement, and he thought the employment of those five social classes for the purpose of making a rough social standardization of local populations was likely to lead to interesting conclusions both as regards fertility and mortality. Unfortunately, however, the classifications of local populations in those five groups were not given in the 1921 Census Reports. The classification into the major divisions by age and sex was given, and also the minute classification by sexes, and although the totals for the five social classes might be worked out from these by means of the code numbers provided, such a process would be rather terrible to contemplate. It might be that there were official reasons why the division of local populations into five social groups might be deemed inadvisable in the Census Reports, and that the local totals were actually available in the Registrar General's Department. He therefore took this opportunity of asking Dr. Stevenson whether he might be able to short-circuit the customary official quotation for such work, and make this simple five-group classification of populations more easily available to poor medical statisticians like himself?

Another point to which Dr. Stocks said he would like to refer was Dr. Stevenson's statement about cancer mortality. Dr. Stevenson pointed out that whereas for cancers of exposed sites there was a very definite variation of mortality with social class in the usual direction, there was little or no variation for cancers of non-exposed sites.

In the Decennial Supplement he showed that at ages over seventy the relation with social class for these deep cancers was actually reversed, so that there was a higher apparent mortality in the upper than in the lower classes to the extent of about 30 per cent., and suggested that this might be entirely due to decreasing precision of certification in passing down the social scale. It seemed to Dr. Stocks that if that were admitted, one might with equal force postulate a greater variation of, say, 50 per cent. due to differing precision of certification in old people, and also allow for some differing precision in diagnosis at the other age groups, and if this were done we should be left with a social variation of mortality for the deep cancers of the same kind, though not so pronounced, as for cancers of exposed sites.

Dr. Stocks said he would like to repeat that he had listened to Dr. Stevenson's paper with great interest, and had much pleasure in supporting the Vote of Thanks.

SIR GEORGE BUCHANAN said he only wished to say one word

because it was a pleasure to thank Dr. Stevenson for his paper, a most useful companion to the recently issued report on Occupational Mortality, which had probably been studied by all present. These Decennial Reports had been of extraordinary value from the public health point of view, and their value was increasing. They had heard from Dr. Stevenson how at the last Census he had been able to introduce some well-designed improvements in the occupational data obtained, which had enabled him to present his results in an improved form and draw conclusions on new lines. It could only be hoped that when he came to the next Census and to the next Decennial Report he would be successful in producing a volume of equal interest to the present one.

There were really only two points to which he wished to refer. One was that it was necessary not to lose sight of proportion in considering the results of this division of mortality among social classes. The chief point of interest to himself, in looking at the results of these divisions, was not so much Class I and Class V, but the block in the middle classes II, III, and IV, and those classes represented as much as 84 per cent. of the whole of the deaths with which Dr. Stevenson was dealing. When that was looked at, one did not find a very large variation in the total mortality. Of course there was some difference, but they were fairly levelled up, and they all showed an improvement on the decennium before. If that were not so it would indeed be a disappointment to those who had to practise public health. What had they been doing in all their past work—spending money and research—but to try and level things? They endeavoured to work so that medicine was not only for the rich, but was brought to the people's door, and to see that knowledge of questions of keeping healthy and of the treatment of disease should permeate through all classes of society. On that side it was satisfactory to find the central block was a fairly level block.

As to the extremes, it was interesting to speculate as to why the classes in Group I had less mortality, but the range of possible explanations was very large. The distinctions between wealth, culture, and such things were interesting for speculation, but one doubted whether they counted for more than that at one end of the scale there were people who had a more sheltered life, better nutrition, less exposure to risk, while at the other end just the opposite condition was found. The chief value of Classes I and V lay in the indications given by the extent of their contrast with the big block in the centre.

Sir George Buchanan added that the subject illustrated, all through, the great importance of accuracy in the fundamental basis of all this work—the terms of the certificate of death and the diagnosis. It might not always be safe to assume that in Class I and Class V there was always the same degree of error as to the death from a particular cause and the way it was certified. In such cases as deaths from syphilis, one might assume that there might be a difference, in that Class I would certainly object to the word "syphilis" appearing on the death certificate, while Class V was inarticulate in

the matter. One could not help wondering whether such a thing also applied in the case of appendicitis—whether the fashionable diagnosis in Class I tended towards appendicitis, while in the other social grades it was thought less necessary to put the term appendicitis in the death certificate. In conclusion, he was glad to see that the General Medical Council is now being asked definitely to include a training in the nomenclature and certification of causes of death in the medical curriculum, and to examine students upon it. If a student knew he would be liable to have questions on this subject in his qualifying examination, there would be less inaccuracy in the certifying of deaths than existed at present.

SIR BERNARD MALLET said that before calling on Dr. Stevenson to reply, he would like to say what a pleasure it had been to him to be in the Chair during the reading of the paper, and to sit again at the feet of this master of the art. He himself had been much interested in this classification of social grades, as he was also interested in eugenics, and he thought it very useful to be reminded that if they were to find out how the different classes were reproducing themselves, a balance must be made between mortality and natality. It was very important to know definitely about the relative increase of different classes.

The Vote of Thanks proposed by Dr. Greenwood and seconded by Sir William Hamer was now put to the meeting and carried unanimously.

DR. STEVENSON: In view of the lateness of the hour, I hope to be very brief in any few remarks I have to make.

As to the influence upon mortality of the factor which I have described as culture, I think I had better leave the views of the proposer and seconder of the motion to counterbalance each other. As to the use of the word "preventable" in connection with cancer, I can only say that to my own mind the contrasts established in social gradation did seem to make a very definite difference to the question. I had always, I think, been accustomed to regard cancer as in a sense inevitable. If you were born to die of cancer you would die of cancer, and that was all there was to it, but if you see that one section of society is living under conditions which result in avoidance of cancer by a disproportionately large percentage of that section, and that, from the nature of the distribution of those deaths over the parts of the body subject to cancer, they may be explained as probably the result of certain influences to which those parts of the human frame are subjected, it does seem to me that the position is altered, and I can conceive of a time coming when the section of society which at present is exposed to those harmful influences will be able to protect itself from them as those at the opposite end of the social scale are so largely doing already.

Sir Alfred Watson spoke of the inclusion of agricultural labourers in Group IV. I admit that agricultural labourers do form a difficulty, but one had to put them somewhere if a simple grouping was

to be made, and my feeling was that it was an advantage to have a simple division of the whole community into five main groups and to include everyone. Ten years previously I had excluded agricultural labourers in view of considerations of the kind referred to, but I found later that a classification partly social and partly occupational was a constant embarrassment, so I determined to take the risk of putting agricultural labourers into the common pot and boiling them all up together, while recognizing the difficulty involved.

Sir Alfred Watson asked for quinquennial age groupings for classifications. I am afraid that is asking for a great deal, but I hope that on another occasion we may be able at all events to round off the tabulation better than was done this time, when we have one group of 65 to 70, so that we do meet the demand for quinquennial grouping in one solitary instance—and then a great group of 70 upwards in one. I think that 65 to 75 and 75 onwards would form a much better grouping because one found the significance of so wide a group as 70 and over to be very doubtful. So much depends upon the way in which it is constituted.

Dr. Stocks asks if we have any records of the local population in the five classes. I am afraid the answer is in the negative. He will find, of course, the populations for the five classes as a whole in the abstracts at the back of the Report, but that is as far as we have gone. It must be remembered that this is a new and experimental classification, and one did not feel entitled to press for a great deal of tabulation while it was still young and untried. If it is found that there is a further demand from workers for local detail on the lines of this tabulation, then that is a matter which will have to be taken into account on another occasion, but I think that all we could be expected to do for 1921 was to deal with the country as a whole.

I was interested by his point as to the possibility of the reversed gradation of cancer mortality, which we see in operation in Diagram 4 of the Report at ages over 70, applying also at ages under 70, so that it might be thought that the characteristic social distribution shown for the exposed sites applied also in some degree to the other sites, but I think I could show a good deal of evidence that diagnosis becomes much worse after 70 than earlier in life, and therefore because of this faulty diagnosis in old age we cannot assume that there is any corresponding distortion of the facts of social gradation at younger ages. The feeling seems to be that as when a man is very old he has soon to die in any case, the precise manner of his death is not of such interest as when he is cut off in youth or middle age.

I quite agree with what Sir George Buchanan said as to the closeness of the mortalities for Classes II—IV. Is not that an experience one would expect to find in any such grouping? The big differences are going to be shown by the extremes, and the great block of people somewhere nearer the middle are not to be expected to present great differences; they are all living fairly near to average conditions. It is only to the few that either luxury or misery can

apply, and I think the results quite accord with the distribution to be expected of such a grouping.

As to efforts made to secure better certification of causes of death, I am glad to know that they have the support of the Department that Sir George represents, for though certification is steadily improving it is still far from what it might easily become if the medical profession as a whole could be induced to take a real interest in this record of its experience.

As a result of the ballot taken during the meeting, the candidates named below were elected Fellows of the Society :—

David Solomon Erulkar, B.A.
Mohamed Shaik Hoosain.
Charles Garland Hughes.
Thomas Joseph Kiernan.

Tom Seth Newman.
Reginald Frederick Silvester.
Charles Frederick Thompson Walker.
Philip Barrett Whale.

MISCELLANEA.

CHANGES IN SEX AND AGE CONSTITUTIONS OF SOME REPRESENTATIVE
EUROPEAN POPULATIONS.

By S. DE JASTRZEBSKI.

No apology is needed for presenting a paper dealing with some aspect of vital statistics in the *Journal*. They have not been so numerous recently as to have become a drug in the Society's market, indeed they have been so comparatively rare that one may hope that this modest effort may derive an added value from its rarity.

Still less need is there for apology in the subject chosen; it has cried aloud for treatment for some time. Beyond the very interesting pages devoted to it in the Registrar-General's General Report on the Census, it appears to have been sedulously avoided by statistical experts. Possibly the snags, pitfalls, gins and traps with which it is so plentifully beset have made our statistical angels fear to tread the thorny path, but it must not be inferred that I have too boldly rushed in.

The choice of material has been restricted by the absence of much that could with great advantage be included. The figures relating to France and Italy were not available, while Austria and Hungary, as at present constituted, are but pale shadows of their former selves and afford no bases for a comparative study.

This paper is therefore restricted to six of the countries of Europe; three of them—Great Britain, Belgium and Germany—belligerents in the Great War, three of them—the Netherlands, Sweden and Switzerland—neutrals.

Before asking you to consider the comparative tables which have been prepared, it is necessary to point out certain facts, more or less obvious, which must be taken into consideration. In the cases of Belgium and the three neutral countries the census figures of 1900, 1910 and 1920 may be regarded as being strictly comparable, for the addition to the first-named country of Eupen and Malmedy is too insignificant to affect the validity of the comparison. With Germany

there are two disturbing factors. The census was taken in October, 1919, instead of at the end of 1920, that is to say, when the heavy drop in the birth-rate directly caused by the war was at its worst. The figures, therefore, for the first age-group with which we deal are unduly depressed. Further, they relate to a Germany shorn of some 10 per cent. of its former population. Moreover, at the time that the census of 1919 was taken some 300,000 German prisoners-of-war had not been returned to their native country, and the figures of males at military ages are unduly deflated. As, however, there were some 200,000 Russian prisoners-of-war still in Germany, the deflation is not so great as might be imagined. These are serious drawbacks, but not so serious as would have been the total exclusion of the figures relating to Germany.

Finally, in the case of Great Britain the unfortunate postponement of the census brought into our figures a greater proportion of the short-lived boom in the birth-rate than would have been the case had the original date been adhered to. The figures, therefore, as regards the first age-group must be regarded as being, to this extent, unduly inflated.

The factor of over-seas migration must also be taken into account in any consideration of the comparative results of the last census. Its incidence during the earlier years of this century had varied considerably in the countries under review, and the practical cessation of migration during the half of the intercensal period 1910-20 has affected their age and sex constitutions in varying degrees. Speaking generally, it may be said that the countries least affected in this respect are the Netherlands, Belgium and Germany, that Switzerland occupies a middle place, while the effects of over-seas migration are most marked in Great Britain and Sweden.

Having thus indicated briefly the principal points which must be considered in connection with the tables presented, let us pass on to review the main facts which these tables reveal.

As will be seen, these tables relate to the three censuses of 1900-1, 1910-11, and 1920-21. (I refer to mis-statements of ages at censuses just to show that we have not missed the point.)

The tables given are extracted from the various censuses as they were returned, without any attempt to correct for presumed errors and mis-statements of ages. The age-grouping adopted should largely minimize these, while the inferences which may be drawn legitimately from the tables will not be affected by such relatively minor errors.

These tables show that there were marked differences in the age and sex constitutions of the six countries under review at the begin-

ning of the present century. In regard to age distribution, if we adopt four divisions—viz. infancy, up to the age of 5; childhood, from 5 to 15; the working period, from 15 to 65; and age, over 65—the position in 1900–1 was as follows: Infancy: Switzerland, 11.4 per cent.; Great Britain and Sweden, 11.5 per cent.; Belgium, 11.7 per cent.; Netherlands, 13.0 per cent.; Germany, 13.1 per cent.; Childhood: Switzerland, 19.6 per cent.; Belgium, 20.0 per cent.; Great Britain and Sweden, 21.0 per cent.; Germany, 21.7 per cent.; Netherlands, 21.8 per cent. Working period: Netherlands and Sweden, 59.2 per cent.; Germany, 60.3 per cent.; Belgium, 62.1 per cent.; Great Britain, 62.8 per cent.; Switzerland, 63.2 per cent. Age: Great Britain, 4.7 per cent.; Germany, 4.9 per cent.; Switzerland, 5.8 per cent.; Netherlands, 6.0 per cent.; Belgium, 6.2 per cent. Sweden, 8.4 per cent. Thus Germany and the Netherlands had over 11 per cent. more of their respective populations under 15 years of age than had Switzerland, and over 10 per cent. more than had Great Britain or Sweden. At what I have, for want of a better term, called the working period, Switzerland had nearly 7 per cent. more than had the Netherlands or Sweden, while Great Britain had 4 per cent. more than Germany. Finally, in the aged group Sweden had nearly 80 per cent. more than this country.

In regard to sex distribution this ranged from 1,013 females to 1,000 males in Belgium to 1,067 in Great Britain. The disparity, however, varied considerably at ages. Up to the age of 15 none of the countries had an excess of females over males; between 15 and 30, however, while there were only 983 females to 1,000 males in Sweden and 991 in Belgium, 1,005 in Germany and in Switzerland, and 1,027 in the Netherlands, there were 1,081 in Great Britain. This proportion is swollen by the absence of troops in South Africa, but even allowing for this fact the difference is very great. At ages 30–50 the proportions range from 1,013 in Belgium, 1,032 in the Netherlands and in Germany, 1,036 in Switzerland, to 1,079 in Great Britain and 1,119 in Sweden. The excess of females becomes much more marked at ages over 50, ranging from 1,103 in the Netherlands to 1,247 in Belgium.

In Belgium the population up to the age of 60 years contained an equal number of males and females at the beginning of this century, in Great Britain an equality ceased at the age of 15. The period between the first two of the censuses with which we are concerned was one of marked decline in both birth- and death-rates in all six countries. The positive decline in the birth-rate was most marked in Germany and in Belgium, while in the Netherlands and in Sweden the positive fall in the death-rate was almost identical with that of

the birth-rate. The decline in infant mortality counteracted to some extent the falling birth-rate, but each country shows a smaller proportion at the first age-group than at the beginning of the century. In Belgium the fall was 12·5 per cent., in Germany, 8·3 per cent., in Great Britain 6·5 per cent., in Switzerland, 5·6 per cent., in the Netherlands, 3·1 per cent. and in Sweden, 2·2 per cent. At the second age-group Switzerland, the Netherlands and Germany show increased proportions; Belgium, Great Britain and Sweden have decreases. In Switzerland the increase was 3·5 per cent., in the Netherlands and Germany it was insignificant, while the only marked decrease was one of 4 per cent. in Great Britain. At the third age-group Belgium shows a fair increase, as does Germany, Great Britain an even more marked decrease, the Netherlands is practically stationary, Sweden shows a fair decrease and Switzerland a marked increase. At the fourth age-group Belgium, Great Britain and Sweden have appreciable decreases, Germany an increase, the Netherlands and Switzerland have little variation. At ages 20-30 all the countries except Sweden show a decreased proportion; at 30-40 all show marked increases; at 40-50 Sweden alone shows a decrease; at 50-65 Great Britain is the only one to show a marked increase, the others, with the exception of Sweden, where the increase was slight, show decreases of varying amount. At ages above 65 there are increases all round except in Switzerland. To sum up; at our four periods in 1910-11 the percentages were:—Infancy: Belgium, 10·2; Great Britain, 10·7; Switzerland, 10·8; Sweden, 11·2; Germany, 12·0, and the Netherlands, 12·6. The order, as will be seen, is materially different from what it was in 1900-1. Childhood: Great Britain, 20·1; Belgium, 20·3; Sweden and Switzerland, 20·5; the Netherlands, 21·9; Germany, 22·1; again a complete variation in order. Working period: the Netherlands, 59·3; Sweden, 59·8; Germany, 60·9; Switzerland, 62·9; Belgium, 63·1; Great Britain, 63·9. Here every country shows an increased proportion except Switzerland, while Great Britain has displaced that country from the premier position. Aged: Germany, 5·0; Great Britain, 5·2; Switzerland, 5·8; Netherlands, 6·1; Belgium, 6·4; Sweden, 8·4; Germany displaces Great Britain from the position of having the smallest proportion of its population aged 65 and upwards.

In regard to sex distribution, Germany, the Netherlands, Sweden and Switzerland show increases in masculinity; in Great Britain the proportions remain unchanged, in Belgium there is a slight decline. Up to the age of 15 males still preponderate in every one of the six countries. At ages 15 to 30 the proportion in Belgium remains unchanged at 991 females to 1,000 males; in Germany it has fallen

from 1,005 in 1900 to 998; in Great Britain it has fallen from 1,081 to 1,077; in the Netherlands it has dropped from 1,027 to 1,018; in Sweden risen from 983 to 998; in Switzerland fallen from 1,005 to 1,002. At ages 30 to 50 there are decided falls in femininity in four of the countries; in Belgium from 1,013 to 1,002; in Germany from 1,032 to 1,009; in Sweden from 1,119 to 1,084; in Switzerland from 1,036 to 1,018; in Great Britain there is a rise from 1,079 to 1,080, in the Netherlands from 1,032 to 1,042. At ages over 50 there is little change except in Belgium, where the fall is from 1,247 to 1,121.

This brings us to the census of 1919-21, with the four years of war to bring an infinity of complications into the vital history of most of Europe. In the years from 1911 to 1914 the birth-rate was still declining, and the years 1915-19 were marked by an unprecedented drop, which was not confined to the belligerent countries alone. For the infancy group the percentages have fallen to: Netherlands, 11.3; Sweden, 9.6; Great Britain, 8.9; Switzerland, 8.5; Belgium, 6.9; Germany, 6.3. These represent percentage declines on 1910-11 of Netherlands, 9 per cent.; Sweden, 14.3 per cent.; Great Britain, 16.8 per cent.; Switzerland, 21.3 per cent.; Belgium, 43.1 per cent., and Germany, 47.5 per cent. As has been pointed out, the proportion in Great Britain is materially higher owing to the census being taken some six months after those of Belgium, Netherlands, Sweden and Switzerland, while that of Germany is materially lower, as their census was taken some fourteen months earlier. Nevertheless, it is somewhat surprising to find Switzerland showing a heavier fall at these ages than our own. At ages 5-15 (childhood) the changes are naturally less violent. Every country except Germany shows a decline; in Belgium from 20.3 to 18.1 per cent.; in Great Britain from 20.1 to 19.0 per cent.; in the Netherlands from 21.9 to 21.3 per cent.; in Sweden from 20.5 to 19.7 per cent.; in Switzerland from 20.5 to 19.4 per cent. In Germany the proportion remained unchanged at 22.1 per cent. The consequent rise in the proportion at the working period was: Belgium, 63.1 to 68.5, or by 8.5 per cent.; Germany, 60.9 to 65.6, or by 7.7 per cent.; Great Britain, 63.9 to 66.1, or by 3.3 per cent.; Netherlands, 59.3 to 61.5, or by 3.7 per cent.; Sweden, 59.8 to 62.3, or by 4.2 per cent., and Switzerland, 62.9 to 66.2, or by 5.2 per cent. In the aged group the only notable changes are the increases in Germany from 5.0 to 5.4, and in Great Britain from 5.2 to 6.0, and the fall in the Netherlands from 6.1 to 5.8. In the males at ages 20-30 the percentage to total population showed the following changes from the previous census: Belgium, an increase of 0.2; Germany, a decrease of 0.9; Great Britain, a decrease of 0.8; in the

three non-belligerents : Netherlands, an increase of 0.3; Sweden, of 0.4; Switzerland, a decrease of 0.3. For females at the same ages the changes were : Belgium, an increase of 0.5; Germany, of 1.3; Great Britain, a decrease of 0.3; Netherlands, an increase of 0.2; Sweden, of 0.3; Switzerland, of 0.6. For the next age group, 40-50, the males showed no change proportionally in Belgium, a decrease of 0.5 in Germany, of 0.6 in Great Britain, an increase of 0.1 in the Netherlands, of 0.4 in Sweden, and a decrease of 0.6 in Switzerland. Females in the same age-group showed the following changes : Belgium, an increase of 0.2; Germany, of 0.6; Great Britain and the Netherlands no change; Sweden, an increase of 0.4, and Switzerland no change.

In regard to sex distribution, masculinity rose in the Netherlands, where the proportion of females to 1,000 males fell from 1,024 to 1,014, and in Sweden, where it fell from 1,049 to 1,046. It fell in the other countries, where the changes in proportions were : Belgium, from 1,017 to 1,029; Germany, from 1,026 to 1,100; Great Britain, from 1,067 to 1,094; Switzerland, from 1,033 to 1,074.

Up to the age of 20 the changes were slight, being in favour of masculinity in Great Britain, the Netherlands and Sweden, and in favour of femininity in Germany and Switzerland. In every country males were in the majority. The striking advance of masculinity in the three belligerent countries in the first age-group is presumably mainly due to the increase in the male ratio at birth in those countries. At ages 20-30 the changes are violent and marked : in Belgium the ratio of females to males rose from 993 to 1,030; in Germany, from 1,000 to 1,301; in Great Britain, from 1,112 to 1,186; in Switzerland, from 1,012 to 1,123; while in the Netherlands it fell from 1,033 to 1,028, and in Sweden rose from 997 to 1,017. At ages 30-40 the ratio rose from 997 to 1,031 in Belgium; from 1,004 to 1,180 in Germany; from 1,081 to 1,171 in Great Britain; from 1,052 to 1,060 in Sweden, and from 997 to 1,088 in Switzerland; in the Netherlands it fell from 1,048 to 1,035.

It will be seen that among the three belligerents the changes in sex proportions at these ages were relatively slight in Belgium as compared with Germany and Great Britain or with Switzerland, while the Netherlands were scarcely affected at all. The apparently anomalous position of Switzerland admits of a simple explanation, the heavy fall in masculinity being due to the numbers of residents of military ages who were subjects of belligerent countries and who were called to their respective armies. That this is the case is clearly shown by the fact that whereas the total male population in Switzerland at ages 20-30 was only 125 more than in 1910, the

population of Swiss origin was 43,246 more; while at ages 30-40 there was a *decrease* of 13,425 in the total male population, but an increase in the population of Swiss origin of 11,581.

At the high ages the changes are curiously irregular. In Belgium the proportion of females at ages over 65 fell from 1,197 to 1,181; in Germany rose from 1,281 to 1,292; in Great Britain from 1,336 to 1,341; in the Netherlands fell from 1,155 to 1,131; in Sweden from 1,281 to 1,270; and in Switzerland rose from 1,261 to 1,348!

From Tables IX and X the effects on total populations at ages may be seen. The period 1910-20 was marked by two heavy inroads on increase, the war and the great influenza pandemic. In Belgium the total male population showed a slight decline on that of 1910, nearly offset by the increase of females. The total males showed decreases at the first three age-groups, increases at the next two, a slight decrease at ages 30-40, increases up to 65, a decrease at 65-75, and an increase at ages over 75. The females showed decreases at the first three groups and increases at every other. In Germany, if allowance be made for loss of territory and date of census, the total males show a slight decrease balanced by the increase of females. Great Britain shows an increase in both males and females, as do all the non-belligerents. In Great Britain a decrease of males is shown in age-groups -5, 5-10 and 20-30; in Sweden and in Switzerland in age-groups -5 and 5-10; in the Netherlands there are no decreases. Female decreases at age-groups -5 and 5-10 are shown by Great Britain, Sweden and Switzerland.

In the area covered by this survey, notwithstanding the ravages of a war unprecedented in history and of a pandemic such as had not been experienced in any recent times, the population was more dense than it had been in 1910. But the age and sex constitutions of every one of these populations show radical changes, even among the non-belligerents. Some of these were already in progress during the first decade of this century, and are clearly traceable to the decline in both birth- and death-rates and to the trend of migration. Others are the direct result of the world conflict. In every country except Switzerland the 1910 population showed a decline in the proportions aged less than 20 years, and the rate of that decline was increased very materially in the second decade. Among the males aged 20-40, Belgium, the Netherlands and Sweden show increased proportions in the second decade; Germany, Great Britain and Switzerland have substantial declines. Males and females at ages 40-65 show very heavy proportional increases in every country.

In Tables IV and V are given the age proportions within each

sex. Summarized to the four divisions previously adopted the percentages at the three censuses were as follows :—

MALES.

| | Belgium. | | | Germany. | | | Great Britain. | | |
|-------|----------|-------|-------|----------|-------|-------|----------------|-------|-------|
| | 1900. | 1910. | 1920. | 1900. | 1910. | 1919. | 1901. | 1911. | 1921. |
| - 5 | 11.9 | 10.4 | 7.1 | 13.3 | 12.2 | 6.7 | 11.9 | 11.2 | 9.4 |
| 5-15 | 20.2 | 20.6 | 18.4 | 22.1 | 22.4 | 23.4 | 21.8 | 20.7 | 20.0 |
| 15-65 | 62.2 | 63.2 | 68.6 | 60.1 | 60.9 | 65.9 | 62.2 | 63.5 | 64.2 |
| + 65 | 5.7 | 5.8 | 5.8 | 4.4 | 4.5 | 5.0 | 4.2 | 4.6 | 5.4 |

| | Netherlands. | | | Sweden. | | | Switzerland. | | |
|-------|--------------|-------|-------|---------|-------|-------|--------------|-------|-------|
| | 1900. | 1910. | 1920. | 1900. | 1910. | 1920. | 1900. | 1910. | 1920. |
| - 5 | 13.3 | 12.9 | 11.6 | 12.0 | 11.7 | 9.9 | 11.6 | 11.0 | 8.9 |
| 5-15 | 22.2 | 22.4 | 21.7 | 21.8 | 21.3 | 20.5 | 20.0 | 20.9 | 20.1 |
| 15-65 | 58.9 | 59.0 | 61.2 | 58.6 | 59.4 | 61.9 | 62.9 | 62.9 | 65.6 |
| + 65 | 5.6 | 5.7 | 5.5 | 7.6 | 7.6 | 7.6 | 5.4 | 5.2 | 5.4 |

FEMALES.

| | Belgium. | | | Germany. | | | Great Britain. | | |
|-------|----------|-------|-------|----------|-------|-------|----------------|-------|-------|
| | 1900. | 1910. | 1920. | 1900. | 1910. | 1919. | 1901. | 1911. | 1921. |
| - 5 | 11.6 | 10.1 | 6.8 | 12.8 | 11.7 | 5.9 | 11.1 | 10.3 | 8.4 |
| 5-15 | 19.8 | 20.1 | 17.7 | 21.3 | 21.7 | 21.0 | 20.4 | 19.5 | 18.2 |
| 15-65 | 62.0 | 62.9 | 68.4 | 60.5 | 61.0 | 67.2 | 63.4 | 64.4 | 66.8 |
| + 65 | 6.6 | 6.9 | 7.1 | 5.3 | 5.6 | 5.9 | 5.2 | 5.8 | 6.6 |

| | Netherlands. | | | Sweden. | | | Switzerland. | | |
|-------|--------------|-------|-------|---------|-------|-------|--------------|-------|-------|
| | 1900. | 1910. | 1920. | 1900. | 1910. | 1920. | 1900. | 1910. | 1920. |
| - 5 | 12.7 | 12.3 | 11.0 | 11.0 | 10.7 | 9.2 | 11.2 | 10.5 | 8.1 |
| 5-15 | 21.4 | 21.5 | 20.9 | 20.2 | 19.7 | 19.1 | 19.2 | 20.1 | 18.7 |
| 15-65 | 59.4 | 59.7 | 61.9 | 59.7 | 60.3 | 62.6 | 63.4 | 63.0 | 67.2 |
| + 65 | 6.4 | 6.5 | 6.2 | 9.1 | 9.2 | 9.2 | 6.2 | 6.4 | 6.0 |

On these percentages one or two points are worth noting.

In Belgium at ages over 65 the proportion of males to total males rose by 0.1 per cent. from 1900 to 1920, while that of females to total females rose by 0.5 per cent. In Great Britain the outstanding feature is the marked proportional increase in the "aged" group for both males and females; 1.2 per cent. in the case of the former and 1.4 per cent. for the latter. In direct contrast are the proportions for the aged in the three non-belligerent countries. The Netherlands show a decline for both sexes, as does Switzerland for females; in Sweden and Switzerland the males show no change, while in Sweden the females show a rise of 0.1 per cent. only.

Such value as attaches to this paper lies primarily in the tables that accompany it rather than in the somewhat trite remarks in the text. The tables themselves have been prepared with a view to presenting the subject-matter from as many angles as seemed to afford differing lights upon it. No one is better aware of its imperfections and incompleteness as a study of the changes in ages and sexes during the first twenty years of this century in Europe than its compiler. But I cherish the hope that those very shortcomings will stir up someone with greater leisure, a wider choice of material, and a deeper acquaintance with effective statistical treatment than myself to pursue the work. It is worth it, for it is not too much to say, that at the base of any study of the economic conditions of Europe at the present time lies the question of population.

In conclusion it is my pleasant duty to put on record my indebtedness to my old friend and colleague, Mr. Frank Finch, I.S.O., not only for his valued advice and criticism, but for his help in the somewhat trying task of constructing and calculating the tables, and to the Intelligence Staff of the Registrar-General's Office for placing at my disposal the material on which this paper is based.

TABLE I.

Persons. Proportions per 10,000 total population at age-groups.

| Ages. | Belgium. | | | Germany. | | | Great Britain. | | |
|----------|-------------|-------|-------|----------|-------|-------|----------------|-------|-------|
| | 1900. | 1910. | 1920 | 1900. | 1910. | 1919 | 1901. | 1911. | 1921. |
| - 5 | 1,170 | 1,023 | 693 | 1,308 | 1,200 | 634 | 1,149 | 1,074 | 887 |
| 5-10 | 1,033 | 1,031 | 863 | 1,136 | 1,139 | 1,083 | 1,075 | 1,032 | 934 |
| 10-15 | 967 | 1,001 | 942 | 1,036 | 1,066 | 1,131 | 1,030 | 977 | 970 |
| 15-20 | 964 | 925 | 983 | 944 | 968 | 1,083 | 1,001 | 930 | 931 |
| Under 20 | 4,134 | 3,980 | 3,481 | 4,424 | 4,373 | 3,931 | 4,255 | 4,013 | 3,722 |
| 20-30 | 1,728 | 1,668 | 1,740 | 1,697 | 1,633 | 1,673 | 1,827 | 1,730 | 1,617 |
| 30-40 | 1,351 | 1,452 | 1,476 | 1,313 | 1,359 | 1,404 | 1,397 | 1,511 | 1,452 |
| 40-50 | 1,032 | 1,132 | 1,303 | 1,011 | 1,051 | 1,236 | 1,048 | 1,145 | 1,311 |
| 50-65 | 1,136 | 1,132 | 1,348 | 1,068 | 1,047 | 1,215 | 1,005 | 1,076 | 1,294 |
| 20-65 | 5,247 | 5,384 | 5,867 | 5,089 | 5,125 | 5,528 | 5,277 | 5,464 | 5,674 |
| 65-75 | 433 | 453 | 454 | 355 | 372 | 402 | 331 | 379 | 433 |
| Over 75 | 186 | 182 | 198 | 133 | 132 | 139 | 137 | 144 | 171 |
| Over 65 | 619 | 635 | 652 | 488 | 504 | 541 | 468 | 523 | 604 |
| | Netherlands | | | Sweden. | | | Switzerland. | | |
| | 1900. | 1910 | 1920. | 1900. | 1910. | 1920 | 1900. | 1910. | 1920. |
| - 5 | 1,299 | 1,259 | 1,132 | 1,147 | 1,122 | 956 | 1,140 | 1,076 | 847 |
| 5-10 | 1,129 | 1,141 | 1,085 | 1,066 | 1,053 | 971 | 1,016 | 1,051 | 938 |
| 10-15 | 1,054 | 1,033 | 1,045 | 1,031 | 996 | 1,002 | 945 | 999 | 1,006 |
| 15-20 | 953 | 949 | 984 | 945 | 928 | 944 | 952 | 950 | 997 |
| Under 20 | 4,435 | 4,402 | 4,246 | 4,189 | 4,099 | 3,873 | 4,053 | 4,076 | 3,788 |
| 20-30 | 1,625 | 1,604 | 1,651 | 1,520 | 1,559 | 1,627 | 1,733 | 1,650 | 1,683 |
| 30-40 | 1,265 | 1,317 | 1,323 | 1,192 | 1,248 | 1,329 | 1,377 | 1,458 | 1,401 |
| 40-50 | 974 | 1,023 | 1,091 | 1,052 | 1,019 | 1,083 | 1,048 | 1,125 | 1,259 |
| 50-65 | 1,101 | 1,041 | 1,105 | 1,211 | 1,230 | 1,248 | 1,206 | 1,110 | 1,282 |
| 20-65 | 4,965 | 4,985 | 5,170 | 4,975 | 5,056 | 5,287 | 5,364 | 5,343 | 5,625 |
| 65-75 | 418 | 432 | 401 | 558 | 539 | 539 | 432 | 428 | 414 |
| Over 75 | 182 | 180 | 183 | 278 | 305 | 301 | 151 | 153 | 173 |
| Over 65 | 600 | 612 | 584 | 836 | 844 | 840 | 583 | 581 | 587 |

TABLE II.

Males. Proportions per 10,000 total population at age-groups.

| Ages. | Belgium. | | | Germany. | | | Great Britain. | | |
|----------|--------------|-------|-------|----------|-------|-------|----------------|-------|-------|
| | 1900. | 1910. | 1920. | 1900. | 1910. | 1919. | 1901. | 1911. | 1921. |
| - 5 | 588 | 514 | 351 | 656 | 604 | 321 | 574 | 540 | 449 |
| 5-10 | 518 | 517 | 432 | 569 | 572 | 545 | 537 | 516 | 469 |
| 10-15 | 485 | 502 | 472 | 519 | 535 | 568 | 516 | 488 | 487 |
| 15-20 | 484 | 464 | 492 | 473 | 485 | 539 | 497 | 462 | 460 |
| Under 20 | 2,075 | 1,997 | 1,747 | 2,217 | 2,196 | 1,973 | 2,124 | 2,006 | 1,865 |
| 20-30 | 868 | 837 | 857 | 845 | 819 | 727 | 863 | 819 | 739 |
| 30-40 | 676 | 727 | 727 | 651 | 693 | 644 | 669 | 726 | 669 |
| 40-50 | 511 | 564 | 646 | 492 | 518 | 602 | 507 | 551 | 625 |
| 50-65 | 551 | 544 | 653 | 498 | 490 | 581 | 473 | 512 | 619 |
| 20-65 | 2,606 | 2,672 | 2,883 | 2,486 | 2,520 | 2,554 | 2,512 | 2,608 | 2,652 |
| 65-75 | 204 | 210 | 205 | 160 | 165 | 177 | 146 | 167 | 192 |
| Over 75 | 82 | 79 | 94 | 58 | 56 | 59 | 56 | 57 | 66 |
| Over 65 | 286 | 289 | 299 | 218 | 221 | 236 | 202 | 224 | 258 |
| All ages | 4,967 | 4,958 | 4,929 | 4,921 | 4,937 | 4,763 | 4,838 | 4,838 | 4,775 |
| | Netherlands. | | | Sweden. | | | Switzerland. | | |
| | 1900. | 1910. | 1920. | 1900. | 1910. | 1920. | 1900. | 1910. | 1920. |
| - 5 | 655 | 636 | 577 | 583 | 573 | 488 | 571 | 541 | 429 |
| 5-10 | 568 | 577 | 549 | 544 | 535 | 495 | 509 | 526 | 472 |
| 10-15 | 531 | 531 | 528 | 520 | 506 | 511 | 473 | 500 | 504 |
| 15-20 | 478 | 477 | 496 | 482 | 472 | 479 | 480 | 479 | 491 |
| Under 20 | 2,232 | 2,221 | 2,150 | 2,129 | 2,086 | 1,973 | 2,033 | 2,046 | 1,896 |
| 20-30 | 794 | 789 | 817 | 761 | 773 | 813 | 859 | 820 | 793 |
| 30-40 | 619 | 643 | 650 | 566 | 608 | 645 | 681 | 730 | 671 |
| 40-50 | 483 | 503 | 535 | 493 | 480 | 526 | 507 | 550 | 612 |
| 50-65 | 535 | 509 | 540 | 559 | 570 | 580 | 561 | 515 | 600 |
| 20-65 | 2,431 | 2,444 | 2,542 | 2,379 | 2,431 | 2,564 | 2,608 | 2,615 | 2,676 |
| 65-75 | 195 | 204 | 191 | 253 | 242 | 244 | 198 | 190 | 180 |
| Over 75 | 81 | 80 | 83 | 119 | 128 | 126 | 69 | 67 | 70 |
| Over 65 | 276 | 284 | 274 | 372 | 370 | 370 | 267 | 257 | 250 |
| All ages | 4,939 | 4,949 | 4,966 | 4,880 | 4,887 | 4,907 | 4,908 | 4,918 | 4,822 |

TABLE III.

Females. Proportion per 10,000 total population at age-groups.

| Ages. | Belgium. | | | Germany. | | | Great Britain. | | |
|----------|--------------|-------|-------|----------|-------|-------|----------------|-------|-------|
| | 1900. | 1910 | 1920. | 1900 | 1910 | 1919. | 1901. | 1911. | 1921. |
| - 5 | 582 | 509 | 342 | 652 | 596 | 313 | 575 | 534 | 438 |
| 5-10 | 515 | 514 | 431 | 568 | 569 | 538 | 538 | 516 | 465 |
| 10-15 | 482 | 499 | 470 | 517 | 531 | 563 | 514 | 489 | 483 |
| 15-20 | 480 | 461 | 491 | 471 | 483 | 544 | 504 | 468 | 471 |
| Under 20 | 2,059 | 1,983 | 1,734 | 2,208 | 2,177 | 1,958 | 2,131 | 2,007 | 1,857 |
| 20-30 | 860 | 831 | 883 | 852 | 819 | 946 | 964 | 911 | 878 |
| 30-40 | 675 | 725 | 749 | 662 | 696 | 760 | 728 | 785 | 783 |
| 40-50 | 521 | 568 | 657 | 519 | 533 | 634 | 541 | 594 | 686 |
| 50-65 | 585 | 588 | 695 | 570 | 557 | 634 | 532 | 566 | 675 |
| 20-65 | 2,641 | 2,712 | 2,984 | 2,603 | 2,605 | 2,974 | 2,765 | 2,856 | 3,022 |
| 65-75 | 229 | 243 | 249 | 195 | 207 | 225 | 185 | 212 | 241 |
| Over 75 | 104 | 103 | 104 | 75 | 76 | 80 | 81 | 87 | 105 |
| Over 65 | 333 | 346 | 353 | 270 | 283 | 305 | 266 | 266 | 346 |
| All ages | 5,033 | 5,041 | 5,071 | 5,081 | 5,065 | 5,237 | 5,162 | 5,162 | 5,225 |
| | Netherlands. | | | Sweden. | | | Switzerland. | | |
| | 1900 | 1910 | 1920 | 1900. | 1910. | 1920 | 1900 | 1910. | 1920. |
| - 5 | 644 | 623 | 555 | 504 | 549 | 468 | 569 | 535 | 418 |
| 5-10 | 561 | 564 | 536 | 522 | 518 | 476 | 507 | 525 | 466 |
| 10-15 | 523 | 522 | 517 | 511 | 490 | 491 | 472 | 499 | 502 |
| 15-20 | 475 | 472 | 486 | 463 | 456 | 465 | 472 | 471 | 506 |
| Under 20 | 2,203 | 2,181 | 2,096 | 2,060 | 2,013 | 1,900 | 2,020 | 2,030 | 1,892 |
| 20-30 | 831 | 815 | 834 | 759 | 786 | 814 | 874 | 830 | 890 |
| 30-40 | 646 | 674 | 673 | 626 | 640 | 684 | 696 | 728 | 730 |
| 40-50 | 491 | 520 | 556 | 559 | 539 | 557 | 541 | 575 | 647 |
| 50-65 | 566 | 532 | 565 | 652 | 660 | 666 | 645 | 595 | 682 |
| 20-65 | 2,534 | 2,541 | 2,628 | 2,596 | 2,625 | 2,723 | 2,756 | 2,725 | 2,949 |
| 65-75 | 223 | 228 | 210 | 305 | 297 | 295 | 234 | 238 | 234 |
| Over 75 | 101 | 100 | 100 | 159 | 177 | 175 | 82 | 86 | 103 |
| Over 65 | 324 | 328 | 310 | 464 | 474 | 470 | 316 | 324 | 337 |
| All ages | 5,061 | 5,050 | 5,034 | 5,120 | 5,112 | 5,093 | 5,092 | 5,082 | 5,178 |

TABLE IV.

Males. Proportions per 10,000 males at age-groups.

| Ages. | Belgium. | | | Germany. | | | Great Britain. | | |
|----------|--------------|-------|-------|----------|-------|-------|----------------|-------|-------|
| | 1900. | 1910. | 1920. | 1900. | 1910. | 1919. | 1901. | 1911. | 1921. |
| - 5 | 1,186 | 1,038 | 714 | 1,333 | 1,224 | 675 | 1,186 | 1,116 | 940 |
| 5-10 | 1,043 | 1,043 | 880 | 1,156 | 1,159 | 1,144 | 1,110 | 1,065 | 983 |
| 10-15 | 976 | 1,012 | 960 | 1,055 | 1,086 | 1,194 | 1,067 | 1,010 | 1,020 |
| 15-20 | 974 | 936 | 1,000 | 961 | 983 | 1,130 | 1,027 | 956 | 963 |
| Under 20 | 4,179 | 4,029 | 3,554 | 4,505 | 4,452 | 4,143 | 4,390 | 4,147 | 3,906 |
| 20-30 | 1,747 | 1,688 | 1,742 | 1,718 | 1,659 | 1,528 | 1,783 | 1,692 | 1,549 |
| 30-40 | 1,362 | 1,466 | 1,479 | 1,323 | 1,405 | 1,352 | 1,383 | 1,501 | 1,401 |
| 40-50 | 1,029 | 1,136 | 1,314 | 998 | 1,046 | 1,264 | 1,048 | 1,139 | 1,309 |
| 50-65 | 1,109 | 1,099 | 1,328 | 1,012 | 994 | 1,215 | 977 | 1,058 | 1,295 |
| 20-65 | 5,247 | 5,389 | 5,563 | 5,051 | 5,104 | 5,359 | 5,191 | 5,390 | 5,554 |
| 65-75 | 409 | 423 | 424 | 325 | 334 | 373 | 303 | 345 | 402 |
| Over 75 | 165 | 160 | 159 | 117 | 112 | 125 | 116 | 118 | 138 |
| Over 65 | 574 | 583 | 583 | 442 | 446 | 498 | 419 | 463 | 540 |
| | Netherlands. | | | Sweden | | | Switzerland. | | |
| | 1900. | 1910. | 1920. | 1900. | 1910. | 1920. | 1900. | 1910. | 1920. |
| - 5 | 1,327 | 1,286 | 1,161 | 1,196 | 1,173 | 994 | 1,164 | 1,100 | 889 |
| 5-10 | 1,149 | 1,165 | 1,105 | 1,111 | 1,094 | 1,008 | 1,036 | 1,070 | 961 |
| 10-15 | 1,074 | 1,073 | 1,064 | 1,069 | 1,036 | 1,044 | 984 | 1,017 | 1,046 |
| 15-20 | 967 | 964 | 999 | 984 | 965 | 977 | 978 | 973 | 1,019 |
| Under 20 | 4,517 | 4,488 | 4,329 | 4,364 | 4,268 | 4,023 | 4,142 | 4,160 | 3,915 |
| 20-30 | 1,608 | 1,595 | 1,645 | 1,559 | 1,577 | 1,656 | 1,751 | 1,666 | 1,645 |
| 30-40 | 1,255 | 1,300 | 1,308 | 1,159 | 1,244 | 1,314 | 1,366 | 1,483 | 1,392 |
| 40-50 | 977 | 1,016 | 1,077 | 1,011 | 983 | 1,066 | 1,033 | 1,119 | 1,269 |
| 50-65 | 1,084 | 1,028 | 1,087 | 1,146 | 1,166 | 1,182 | 1,144 | 1,049 | 1,243 |
| 20-65 | 4,924 | 4,939 | 5,117 | 4,875 | 4,970 | 5,218 | 5,314 | 5,317 | 5,549 |
| 65-75 | 395 | 413 | 385 | 518 | 495 | 497 | 404 | 387 | 374 |
| Over 75 | 163 | 162 | 169 | 243 | 267 | 261 | 140 | 136 | 162 |
| Over 65 | 558 | 575 | 554 | 761 | 762 | 758 | 544 | 523 | 536 |

TABLE V.

Females. Proportions per 10,000 females at age-groups.

| Ages. | Belgium. | | | Germany. | | | Great Britain. | | |
|----------|--------------|-------|-------|----------|-------|-------|----------------|-------|-------|
| | 1900. | 1910. | 1920. | 1900. | 1910. | 1920. | 1901. | 1911. | 1921. |
| - 5 | 1,157 | 1,009 | 675 | 1,283 | 1,175 | 595 | 1,113 | 1,035 | 839 |
| 5-10 | 1,024 | 1,019 | 847 | 1,117 | 1,120 | 1,028 | 1,043 | 999 | 890 |
| 10-15 | 957 | 989 | 925 | 1,017 | 1,049 | 1,074 | 996 | 947 | 925 |
| 15-20 | 953 | 915 | 967 | 927 | 954 | 1,037 | 976 | 907 | 901 |
| Under 20 | 4,091 | 3,932 | 3,414 | 4,344 | 4,298 | 3,734 | 4,128 | 3,888 | 3,553 |
| 20-30 | 1,709 | 1,645 | 1,738 | 1,628 | 1,617 | 1,805 | 1,867 | 1,764 | 1,680 |
| 30-40 | 1,340 | 1,439 | 1,472 | 1,303 | 1,375 | 1,451 | 1,411 | 1,521 | 1,499 |
| 40-50 | 1,035 | 1,126 | 1,295 | 1,021 | 1,051 | 1,212 | 1,048 | 1,151 | 1,312 |
| 50-65 | 1,164 | 1,165 | 1,368 | 1,122 | 1,100 | 1,211 | 1,030 | 1,097 | 1,292 |
| 20-65 | 5,245 | 5,378 | 5,873 | 5,124 | 5,143 | 5,679 | 5,356 | 5,533 | 5,783 |
| 65-75 | 455 | 484 | 490 | 385 | 408 | 429 | 359 | 410 | 460 |
| Over 75 | 207 | 207 | 223 | 147 | 149 | 158 | 157 | 169 | 202 |
| Over 65 | 662 | 691 | 713 | 532 | 557 | 587 | 516 | 579 | 662 |
| | Netherlands. | | | Sweden. | | | Switzerland. | | |
| | 1900. | 1910. | 1920. | 1900. | 1910. | 1920. | 1900. | 1910. | 1920. |
| - 5 | 1,272 | 1,233 | 1,104 | 1,101 | 1,072 | 917 | 1,119 | 1,051 | 809 |
| 5-10 | 1,110 | 1,118 | 1,062 | 1,024 | 1,014 | 944 | 996 | 1,032 | 900 |
| 10-15 | 1,034 | 1,033 | 1,025 | 994 | 958 | 962 | 927 | 982 | 969 |
| 15-20 | 939 | 935 | 966 | 903 | 893 | 912 | 926 | 928 | 977 |
| Under 20 | 4,355 | 4,319 | 4,157 | 4,022 | 3,937 | 3,735 | 3,968 | 3,993 | 3,655 |
| 20-30 | 1,641 | 1,613 | 1,657 | 1,483 | 1,542 | 1,600 | 1,716 | 1,634 | 1,721 |
| 30-40 | 1,273 | 1,336 | 1,337 | 1,223 | 1,252 | 1,345 | 1,368 | 1,432 | 1,411 |
| 40-50 | 970 | 1,030 | 1,104 | 1,090 | 1,054 | 1,094 | 1,063 | 1,132 | 1,250 |
| 50-65 | 1,118 | 1,054 | 1,122 | 1,273 | 1,293 | 1,310 | 1,265 | 1,172 | 1,362 |
| 20-65 | 5,002 | 5,033 | 5,220 | 5,069 | 5,141 | 5,349 | 5,412 | 5,370 | 5,744 |
| 65-75 | 441 | 451 | 418 | 598 | 581 | 578 | 459 | 468 | 452 |
| Over 75 | 202 | 197 | 205 | 311 | 341 | 339 | 161 | 169 | 149 |
| Over 65 | 643 | 648 | 623 | 909 | 922 | 917 | 620 | 637 | 601 |

TABLE VI.

Females per 1,000 males at age-groups.

| Ages. | Belgium. | | | Germany. | | | Great Britain. | | |
|----------|--------------|-------|-------|----------|-------|-------|----------------|-------|-------|
| | 1900. | 1910. | 1920. | 1900. | 1910. | 1920. | 1901. | 1911. | 1921. |
| - 5 | 990 | 991 | 974 | 994 | 987 | 975 | 1,001 | 990 | 976 |
| 5-10 | 994 | 994 | 997 | 998 | 991 | 987 | 1,002 | 1,000 | 991 |
| 10-15 | 994 | 994 | 996 | 996 | 993 | 991 | 996 | 1,001 | 992 |
| 15-20 | 992 | 994 | 998 | 996 | 996 | 1,009 | 1,014 | 1,012 | 1,024 |
| Under 20 | 992 | 993 | 993 | 996 | 991 | 992 | 1,002 | 1,000 | 996 |
| 20-30 | 991 | 993 | 1,030 | 1,008 | 1,000 | 1,301 | 1,117 | 1,112 | 1,186 |
| 30-40 | 998 | 997 | 1,031 | 1,017 | 1,004 | 1,180 | 1,088 | 1,081 | 1,171 |
| 40-50 | 1,020 | 1,007 | 1,019 | 1,055 | 1,029 | 1,053 | 1,067 | 1,078 | 1,097 |
| 50-65 | 1,062 | 1,061 | 1,064 | 1,145 | 1,137 | 1,090 | 1,125 | 1,106 | 1,092 |
| 20-65 | 1,017 | 1,015 | 1,035 | 1,047 | 1,034 | 1,164 | 1,101 | 1,095 | 1,139 |
| 65-75 | 1,123 | 1,157 | 1,215 | 1,219 | 1,255 | 1,271 | 1,267 | 1,269 | 1,252 |
| Over 75 | 1,270 | 1,304 | 1,106 | 1,293 | 1,357 | 1,356 | 1,439 | 1,530 | 1,602 |
| Over 65 | 1,164 | 1,197 | 1,181 | 1,239 | 1,281 | 1,292 | 1,315 | 1,336 | 1,341 |
| All ages | 1,013 | 1,017 | 1,029 | 1,033 | 1,026 | 1,100 | 1,067 | 1,067 | 1,094 |
| | | | | | | | | | |
| | Netherlands. | | | Sweden. | | | Switzerland. | | |
| | 1900. | 1910. | 1920. | 1900. | 1910. | 1920. | 1900. | 1910. | 1920. |
| - 5 | 983 | 980 | 962 | 967 | 958 | 959 | 998 | 989 | 977 |
| 5-10 | 988 | 976 | 976 | 960 | 968 | 962 | 996 | 998 | 981 |
| 10-15 | 985 | 983 | 980 | 983 | 968 | 961 | 998 | 998 | 996 |
| 15-20 | 994 | 989 | 984 | 961 | 966 | 971 | 983 | 983 | 1,030 |
| Under 20 | 987 | 982 | 975 | 969 | 965 | 963 | 994 | 992 | 998 |
| 20-30 | 1,047 | 1,033 | 1,028 | 997 | 1,017 | 1,001 | 1,018 | 1,012 | 1,123 |
| 30-40 | 1,044 | 1,048 | 1,035 | 1,106 | 1,052 | 1,060 | 1,022 | 997 | 1,088 |
| 40-50 | 1,016 | 1,034 | 1,039 | 1,134 | 1,123 | 1,059 | 1,067 | 1,045 | 1,057 |
| 50-65 | 1,058 | 1,045 | 1,046 | 1,166 | 1,158 | 1,152 | 1,150 | 1,155 | 1,137 |
| 20-65 | 1,042 | 1,040 | 1,034 | 1,091 | 1,080 | 1,062 | 1,057 | 1,042 | 1,102 |
| 65-75 | 1,144 | 1,118 | 1,100 | 1,205 | 1,227 | 1,209 | 1,182 | 1,253 | 1,300 |
| Over 75 | 1,247 | 1,250 | 1,205 | 1,336 | 1,383 | 1,389 | 1,188 | 1,284 | 1,471 |
| Over 65 | 1,174 | 1,155 | 1,131 | 1,274 | 1,281 | 1,270 | 1,184 | 1,261 | 1,348 |
| All ages | 1,025 | 1,024 | 1,014 | 1,049 | 1,046 | 1,038 | 1,037 | 1,033 | 1,074 |

TABLE VII.

Males. Proportions at age-groups, with 1900-1 proportions taken as 1,000 at each age-group.

| Ages. | Belgium. | | Germany. | | Great Britain. | |
|----------|--------------|-------|----------|-------|----------------|-------|
| | 1910. | 1920. | 1910. | 1919 | 1911. | 1921. |
| - 5 | 874 | 597 | 921 | 482 | 941 | 782 |
| 5-10 | 998 | 834 | 1,005 | 958 | 961 | 873 |
| 10-15 | 1,035 | 973 | 1,031 | 1,094 | 946 | 944 |
| 15-20 | 959 | 1,017 | 1,025 | 1,140 | 930 | 926 |
| Under 20 | 962 | 842 | 991 | 890 | 944 | 878 |
| 20-30 | 964 | 987 | 969 | 860 | 949 | 856 |
| 30-40 | 1,075 | 1,075 | 1,007 | 989 | 1,085 | 1,000 |
| 40-50 | 1,104 | 1,264 | 1,053 | 1,224 | 1,057 | 1,233 |
| 50-65 | 987 | 1,185 | 984 | 1,167 | 1,062 | 1,309 |
| 20-65 | 1,025 | 1,163 | 1,014 | 1,027 | 1,038 | 1,056 |
| 65-75 | 1,030 | 1,005 | 1,032 | 1,106 | 1,144 | 1,315 |
| Over 75 | 963 | 1,146 | 966 | 1,017 | 1,018 | 1,179 |
| Over 65 | 1,015 | 1,045 | 1,014 | 1,083 | 1,109 | 1,277 |
| | Netherlands. | | Sweden. | | Switzerland. | |
| | 1910. | 1920. | 1910 | 1920. | 1910. | 1920. |
| - 5 | 971 | 881 | 983 | 837 | 947 | 751 |
| 5-10 | 1,016 | 967 | 983 | 910 | 1,033 | 927 |
| 10-15 | 1,000 | 994 | 973 | 983 | 1,057 | 1,066 |
| 15-20 | 998 | 1,038 | 979 | 994 | 998 | 1,023 |
| Under 20 | 993 | 963 | 980 | 927 | 1,006 | 933 |
| 20-30 | 994 | 1,028 | 1,016 | 1,068 | 955 | 923 |
| 30-40 | 1,039 | 1,050 | 1,074 | 1,140 | 1,072 | 985 |
| 40-50 | 1,041 | 1,108 | 974 | 1,067 | 1,085 | 1,207 |
| 50-65 | 951 | 1,009 | 1,020 | 1,038 | 918 | 1,070 |
| 20-65 | 1,005 | 1,046 | 1,022 | 1,078 | 1,003 | 1,026 |
| 65-75 | 1,046 | 980 | 957 | 965 | 959 | 909 |
| Over 75 | 988 | 1,025 | 1,076 | 1,059 | 971 | 1,014 |
| Over 65 | 1,029 | 993 | 995 | 995 | 951 | 937 |

TABLE VIII.

Females. Proportions at age-groups, with 1900-1 proportions taken as 1,000 at each age-group.

| Ages. | Belgium. | | Germany. | | Great Britain. | |
|----------|--------------|-------|----------|-------|----------------|-------|
| | 1910. | 1920. | 1910. | 1919. | 1911. | 1921. |
| - 5 | 875 | 587 | 914 | 480 | 929 | 744 |
| 5-10 | 998 | 837 | 1,000 | 956 | 959 | 864 |
| 10-15 | 1,035 | 975 | 1,028 | 1,089 | 951 | 940 |
| 15-20 | 960 | 1,023 | 1,027 | 1,155 | 876 | 882 |
| Under 20 | 963 | 842 | 986 | 887 | 942 | 872 |
| 20-30 | 966 | 1,027 | 964 | 1,110 | 945 | 911 |
| 30-40 | 1,074 | 1,110 | 1,035 | 1,148 | 1,078 | 1,076 |
| 40-50 | 1,090 | 1,261 | 1,027 | 1,222 | 1,098 | 1,268 |
| 50-65 | 1,005 | 1,188 | 978 | 1,112 | 1,064 | 1,269 |
| 20-65 | 1,027 | 1,130 | 1,001 | 1,143 | 1,033 | 1,093 |
| 65-75 | 1,061 | 1,087 | 1,058 | 1,154 | 1,146 | 1,303 |
| Over 75 | 991 | 1,000 | 1,011 | 1,067 | 1,074 | 1,296 |
| Over 65 | 1,040 | 1,061 | 1,048 | 1,130 | 1,124 | 1,301 |
| | Netherlands. | | Sweden. | | Switzerland. | |
| | 1910. | 1920. | 1910. | 1920. | 1910. | 1920. |
| - 5 | 967 | 862 | 974 | 830 | 940 | 735 |
| 5-10 | 1,005 | 955 | 992 | 914 | 1,035 | 919 |
| 10-15 | 998 | 987 | 959 | 961 | 1,053 | 1,064 |
| 15-20 | 994 | 1,027 | 985 | 1,004 | 998 | 1,072 |
| Under 20 | 990 | 951 | 977 | 922 | 1,005 | 937 |
| 20-30 | 981 | 1,004 | 1,036 | 1,072 | 950 | 1,019 |
| 30-40 | 1,043 | 1,042 | 1,022 | 1,093 | 1,046 | 1,049 |
| 40-50 | 1,059 | 1,132 | 964 | 996 | 1,062 | 1,196 |
| 50-65 | 940 | 998 | 1,012 | 1,025 | 923 | 1,059 |
| 20-65 | 1,003 | 1,037 | 1,011 | 1,049 | 994 | 1,070 |
| 65-75 | 1,022 | 942 | 974 | 967 | 1,017 | 1,000 |
| Over 75 | 990 | 990 | 1,113 | 1,101 | 1,049 | 1,256 |
| Over 65 | 1,013 | 960 | 1,022 | 1,013 | 1,025 | 1,066 |

TABLE IX.

Total males at age-groups, with 1900-1 taken as 1,000 at each age-group.

| Ages. | Belgium. | | Germany. | | Great Britain. | |
|----------|--------------|-------|----------|-------|----------------|-------|
| | 1910. | 1920. | 1910. | 1919. | 1911. | 1921. |
| - 5 | 969 | 660 | 1,062 | 524 | 1,038 | 904 |
| 5-10 | 1,161 | 924 | 1,158 | 1,028 | 1,059 | 1,010 |
| 10-15 | 1,116 | 1,087 | 1,186 | 1,173 | 1,045 | 1,095 |
| 15-20 | 1,064 | 1,125 | 1,181 | 1,221 | 1,027 | 1,090 |
| Under 20 | 1,067 | 935 | 1,141 | 954 | 1,043 | 1,015 |
| 20-30 | 1,069 | 1,091 | 1,115 | 922 | 1,047 | 990 |
| 30-40 | 1,192 | 1,190 | 1,200 | 1,060 | 1,197 | 1,155 |
| 40-50 | 1,222 | 1,398 | 1,209 | 1,313 | 1,199 | 1,424 |
| 50-65 | 1,098 | 1,297 | 1,133 | 1,249 | 1,195 | 1,513 |
| 20-65 | 1,137 | 1,224 | 1,167 | 1,100 | 1,146 | 1,220 |
| 65-75 | 1,144 | 1,117 | 1,190 | 1,186 | 1,259 | 1,518 |
| Over 75 | 1,072 | 1,110 | 1,113 | 1,090 | 1,122 | 1,355 |
| Over 65 | 1,124 | 1,115 | 1,169 | 1,161 | 1,221 | 1,470 |
| All ages | 1,107 | 1,096 | 1,155 | 1,007 | 1,103 | 1,141 |
| | Netherlands. | | Sweden. | | Switzerland. | |
| | 1910. | 1920. | 1910. | 1920. | 1910. | 1920. |
| - 5 | 1,114 | 1,193 | 1,056 | 962 | 1,072 | 879 |
| 5-10 | 1,201 | 1,300 | 1,061 | 1,048 | 1,171 | 1,087 |
| 10-15 | 1,148 | 1,338 | 1,044 | 1,127 | 1,196 | 1,229 |
| 15-20 | 1,146 | 1,396 | 1,051 | 1,143 | 1,128 | 1,291 |
| Under 20 | 1,142 | 1,296 | 1,053 | 1,065 | 1,139 | 1,092 |
| 20-30 | 1,141 | 1,383 | 1,089 | 1,222 | 1,080 | 1,080 |
| 30-40 | 1,191 | 1,410 | 1,156 | 1,311 | 1,213 | 1,176 |
| 40-50 | 1,196 | 1,491 | 1,047 | 1,225 | 1,229 | 1,412 |
| 50-65 | 1,092 | 1,358 | 1,096 | 1,192 | 1,041 | 1,295 |
| 20-65 | 1,154 | 1,406 | 1,097 | 1,237 | 1,135 | 1,217 |
| 65-75 | 1,194 | 1,316 | 1,029 | 1,110 | 1,087 | 1,254 |
| Over 75 | 1,144 | 1,415 | 1,180 | 1,239 | 1,093 | 1,207 |
| Over 65 | 1,185 | 1,345 | 1,078 | 1,151 | 1,088 | 1,240 |
| All ages | 1,150 | 1,353 | 1,075 | 1,155 | 1,134 | 1,150 |

TABLE X.

Total females at age-groups, with 1900-1 taken as 1,000 at each age-group.

| Ages. | Belgium. | | Germany. | | Great Britain. | |
|----------|--------------|-------|----------|-------|----------------|-------|
| | 1910. | 1920. | 1910. | 1919. | 1911. | 1921. |
| - 5 | 981 | 655 | 1,056 | 512 | 1,007 | 881 |
| 5-10 | 1,105 | 923 | 1,152 | 1,016 | 1,057 | 999 |
| 10-15 | 1,147 | 1,077 | 1,184 | 1,166 | 1,044 | 1,086 |
| 15-20 | 1,067 | 1,132 | 1,183 | 1,237 | 1,025 | 1,081 |
| Under 20 | 1,067 | 931 | 1,137 | 940 | 1,039 | 1,008 |
| 20-30 | 1,072 | 1,135 | 1,107 | 1,189 | 1,043 | 1,053 |
| 30-40 | 1,193 | 1,226 | 1,212 | 1,231 | 1,190 | 1,243 |
| 40-50 | 1,210 | 1,393 | 1,180 | 1,310 | 1,212 | 1,465 |
| 50-65 | 1,112 | 1,312 | 1,095 | 1,193 | 1,175 | 1,467 |
| 20-65 | 1,139 | 1,249 | 1,146 | 1,225 | 1,140 | 1,263 |
| 65-75 | 1,180 | 1,202 | 1,137 | 1,233 | 1,260 | 1,499 |
| Over 75 | 1,108 | 1,189 | 1,163 | 1,179 | 1,178 | 1,509 |
| Over 65 | 1,158 | 1,198 | 1,144 | 1,218 | 1,240 | 1,502 |
| All ages | 1,111 | 1,116 | 1,149 | 1,105 | 1,104 | 1,170 |
| | Netherlands. | | Sweden. | | Switzerland. | |
| | 1910. | 1920. | 1910. | 1920. | 1910. | 1920. |
| - 5 | 1,111 | 1,162 | 1,047 | 939 | 1,063 | 861 |
| 5-10 | 1,153 | 1,279 | 1,062 | 1,045 | 1,183 | 1,075 |
| 10-15 | 1,145 | 1,293 | 1,034 | 1,107 | 1,197 | 1,243 |
| 15-20 | 1,140 | 1,380 | 1,061 | 1,154 | 1,148 | 1,256 |
| Under 20 | 1,136 | 1,277 | 1,051 | 1,060 | 1,137 | 1,096 |
| 20-30 | 1,125 | 1,350 | 1,116 | 1,234 | 1,077 | 1,194 |
| 30-40 | 1,201 | 1,404 | 1,099 | 1,256 | 1,185 | 1,224 |
| 40-50 | 1,202 | 1,502 | 1,038 | 1,149 | 1,146 | 1,400 |
| 50-65 | 1,080 | 1,342 | 1,090 | 1,177 | 1,046 | 1,239 |
| 20-65 | 1,150 | 1,395 | 1,089 | 1,207 | 1,111 | 1,253 |
| 65-75 | 1,172 | 1,392 | 1,043 | 1,108 | 1,152 | 1,172 |
| Over 75 | 1,123 | 1,350 | 1,176 | 1,250 | 1,180 | 1,434 |
| Over 65 | 1,157 | 1,378 | 1,089 | 1,165 | 1,160 | 1,240 |
| All ages | 1,145 | 1,334 | 1,073 | 1,143 | 1,130 | 1,190 |

REVIEWS OF STATISTICAL AND ECONOMIC BOOKS.

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1.—*Mathematical Statistics*. By Henry Lewis Rietz. xi + 181 pp. Chicago: Open Court Publishing Company. 1927. Price \$2.

This is the third of the Carus Mathematical Monographs, the object of which is the exposition of mathematical subjects "in a manner comprehensible not only to teachers and students specializing in mathematics, but also to scientific workers in other fields, and especially to the wide circle of thoughtful people who, having a moderate acquaintance with elementary mathematics, wish to extend their knowledge without prolonged and critical study of the mathematical journals and treatises."

The scope of the book is immediately limited by the foregoing, which is taken from the note on the objects of the Carus Monographs facing the title-page, and one can well realize how difficult it must have been for the author to decide what to include and what to reject. What is done is set forth very pleasantly and neatly, but when the reader is taken a certain distance by the author and is preparing to consider his method of dealing with the next step, the discussion of the topic is brought to a close on account of the upper limit imposed as above. This tends to be rather irritating, but at the same time one sympathizes with the author in his being limited to 181 pages, and is thankful that he does indicate the scope of the next stages and gives, in addition, abundant references.

The subjects dealt with are (1) relative frequencies in simple sampling; (2) Pearson Curves and the Gram-Charlier Series (and here one feels that the illustrations of the various Pearson types are over-weighting this subject in a small book, the room could well be used for a talk on the inferences from a sample as to the aggregate); (3) Correlation, where again a good deal of the mathematical analysis

dealing with multiple correlation might well give place to a talk on the meaning of the various measures of correlation (what is meant when we say that $r = .5$?); (4) Errors of sampling; (5) Lexis Theory.

It is very difficult to judge the utility of a book of this type. The statistician, knowing the kind of problems, will be able to appreciate it, and a book of this kind is useful to the mathematical statistician, even with its limitations, but one doubts its appeal to the thoughtful people who wish to extend their knowledge. One feels that this latter class could better be approached by presenting actual data involving specific problems, with a discussion of the kind of information which these data may be made to yield on analysis. Surely they are the kind of people who would appreciate the problems involved in deciding what meaning certain tables of figures have (possibly more so than the mathematical statistician) and would be willing to take the mathematical analysis on trust. E. C. R.

2.—*Business Cycles: the Problem and its Setting.* By Wesley C. Mitchell. 479 pp. New York: National Bureau of Economic Research, Inc. 1927. Price \$6.50.

The output of books in the United States concerning some one or other aspect of business cycles in recent years has been prodigious, and there appears to be no diminution yet. A large number of these have been primarily interested in the problem of trade forecasting, and many have related to individual industries only. The merit of the various productions has varied widely. Many of them would certainly never have been published in countries where the price of newsprint is greater than it is in the United States. Quite a big proportion will have only ephemeral circulation and few will find a permanent niche in economic literature. There is hardly likely to be any difference of opinion, however, regarding the permanent importance of the book which has recently been written by Professor Wesley Mitchell and published by the Bureau of Economic Research of New York.

His fellow Director of the Research Staff of the National Bureau refers to the book in a foreword as a rewriting, based on new and fuller statistical material, of his book on *Business Cycles* published in 1913. This description hardly conveys an adequate account of Professor Mitchell's work. The publications having reference to business cycles which have been issued since that date have contained a wealth of material far greater and more detailed than that in existence before the war, and Professor Mitchell would appear to have conscientiously studied all of them, whatever their merits. There must have been much that was wearisome in his researches, though, in addition to the cases of real merit which required thorough understanding and investigation, occasional humorous interludes appear even in this sphere of work. Such an interlude was provided by the work of the Director of the Federated Jewish Charities of Boston, who, after an elaborate statistical analysis of vital and economic data which demonstrated *inter alia* that "fluctuations in

conceptions precede fluctuations in wholesale prices by about eight months," and that "fluctuations in the death-rate precede fluctuations in wholesale prices by about seventeen months," suggested a causal explanation of these relations in the powerful emotional reactions excited in men by the death of friends and the prospect of having children!

Professor Mitchell's work is a valuable and critical summary of all the work which has been published on any aspect of the business cycle. It is, however, much more than that. It attempts to put every book or investigation on the subject in its proper setting as a contribution towards the whole philosophy of business fluctuations. It does not concern itself with the practical results of the statistical enquiries on the subject as a means of forecasting future business conditions, and in that way, possibly, reducing some individual's pecuniary losses or increasing his profits. It uses these researches for the purpose of enquiring into the fundamental reasons of economic fluctuations. From this point of view the book is to be considered as a contribution to the theory and not to the practice of the subject. Although it is perhaps the duty of a reviewer to point out that the student will be able to get a complete account of the results of many statistical investigations from a study of this book which will save him perusing scores of others, it is the weaving of all these results into a composite picture which is the *raison d'être* of the book and which lifts it above all others on the subject.

Almost at the end of the book the author quotes Professor Irving Fisher, who is a sceptic about the validity of the whole conception of the business cycle and thinks that it is a myth. This is a view which perhaps receives more support on this side of the Atlantic than the other and deserves a much more thorough investigation than it has yet received. Most of the statistical enquiries into the subject in recent years have assumed the existence of periodic cycles of business activity, and have used these to explain the conclusions drawn from their own particular investigation. None have enquired whether the results are such as would follow from the laws of chance applied to economic phenomena associated with expanding populations. Professor Mitchell, for example, states that from 1793 to 1920 there were cycles of every period (in years) from two years to ten years, totalling twenty-two cycles in all. Does not this in itself suggest that chance had a great deal to do with the distribution of the statistics examined and that the assumption of fundamental rhythmic causation is unjustified? At any rate, it would be an excellent piece of work to take one of the statistical investigations of the nature of many referred to in this book, and to investigate whether the deviations noted could be explained on the assumption of random fluctuation.

The author is probably justified in his retort that the critics should take the trouble to find out what those who treat of business cycles mean by that term. This, however, only leads to further confusion of thought, since "those who treat of business cycles" appear to have a wide range of variation in their interpretation of

the term. Professor Mitchell, however, does accept a definition of the term "cycle," which is "applicable alike in meteorology, botany, geology, palæontology, astronomy, geography and economics," viz. an "inclusive term for all recurrences that lend themselves to measurement" . . . "the significance of the term lies in the fact of recurrence rather than in that of the time interval." It is easy to bowl Professor Fisher out if such a definition is adopted, but it is equally clear that this is not the definition (if indeed they have any definition at all in their minds) employed by many who have undertaken researches into some phase or other of the "business cycle," since the object of many of those researches is to discover the time intervals (assumed equal) between successive recurrences. The adoption of such a truncated definition lends support to Professor Fisher's criticism of the work of those who use the term in a narrower sense, since there are few phenomena which do not have recurrences. But most people who use the term believe it denotes a cyclical movement of approximately equal periods, so that when the circumstances of a complete period are known, those of a succeeding period can be approximately forecasted. Much of the analytical work aiming at the determination of the various periods is inconclusive, and from this standpoint Professor Fisher's criticisms seem well founded.

It is quite impossible to deal adequately with this important work in a short review, but serious students of the subject can be assured that it is a book they should possess and one which is likely to become a standard work.

E. C. S.

3.—*Statistics and their Application to Commerce.* By A. Lester Boddington, F.S.S. Fourth edition. 350 pp. London: H. F. L. (Publishers), Ltd. 1927. Price 12s. 6d.

The fourth edition of this work does not differ in material respects from the third edition, which was reviewed in the *Journal* for March 1926 (p. 335).

The questionable features to which attention was drawn by the previous reviewer have not been remedied, and the confusion between "histogram" and "historigram" persists, notwithstanding his remark on the point. One might add that the section on the "normal frequency curve" requires overhauling, for not only are Mr. Boddington's supposedly "normal" curves badly out of drawing, but his general line of treatment seems to imply that "normalcy" is a common feature of business statistics, a proposition both unproven and improbable. The specimen correlation table on p. 287 would have been more instructive had the figures been chosen so as to exhibit a few minus signs in the product column, whilst the application of the ordinary formula for the probable error of the coefficient of correlation to time series involves rather risky assumptions. It is unfortunate that these errors and oversights have not been remedied in the new edition, for they impair the value of a work that contains much excellent matter.

L. R. C.

4.—*A Survey of the Social Structure of England and Wales, as illustrated by Statistics.* By A. M. Carr-Saunders and D. Caradog Jones. xi + 246 pp. Oxford University Press. 1927. Price 10s. net.

Criticism of bureaucracy brings perennial satisfaction, and the temptation to open a statistical survey of this country with reflections upon the inadequacy and unintelligibility of official statistics must have been particularly strong. Whether Messrs. Carr-Saunders and Caradog Jones have been merciful, or merely circumspect, cannot be inferred; whatever their feelings, they have been completely successful in concealing them. Their overt attitude is indicated by the following extract from their introduction, which is otherwise worth quoting as a model of scientific brevity and restraint:—

“Statistical abstracts of social data exist, though not perhaps in any wholly satisfactory form. There is not, however, to be found any attempt to treat contemporary social data from what may be called the morphological point of view. This is the task attempted in this volume. Our aim is to present a coherent picture of some of the more important aspects of social life in this country so far as they can be illustrated by statistics. It is upon the relations of the various aspects of society that stress is laid. A grasp of these relations alone can give any life to the bare bones of social statistics. No attempt has been made to give more than a brief account of any subject treated. We have aimed at selecting the outstanding facts relating to each subject and at weaving them into a coherent whole. Rigorous selection of material has been practised, and matter has only been included which contributes in some fashion to the construction of the picture.”

The principal subject heads are—population, with its various classifications (including housing); occupational and other associations; national income and national wealth; education; state and voluntary provision against misfortune; compulsory and voluntary transfers from rich to poor; poverty; crime; inborn qualities; and the recruitment of population. The only deliberate omissions are commercial and financial data. In the working out of the scheme facts have been taken from any authoritative source, and use has been made of the results obtained by research workers. The treatment often extends beyond a bare quotation of available figures, and existing data have been analysed and combined whenever by so doing it seemed possible to illuminate some problem of importance.

It is needless to say that Messrs. Carr-Saunders and Caradog Jones have performed their task of selection, analysis and criticism admirably, and that their presentation of statistical matter reaches a high standard of technical achievement.

The only doubt one feels inclined to express is whether it should have been necessary to make such a complete sacrifice of the historical aspect of social phenomena. While it is admitted that this mode of treatment would be generally inconsistent with the authors' plan, one feels nevertheless that the primary object of social statistics is to register the amount of progress made, and that the

introduction of a few tables or diagrams designed to illustrate leading features of progress during (say) the past generation would not have burdened available space unduly and would have rendered the authors' conclusions vastly more illuminating.

Altogether this is an excellent piece of work, and it can confidently be recommended to statistician and layman alike.

L. R. C.

5.—*Monopolies, Cartels and Trusts in British Industry*. By Hermann Levy, Ph.D. 2nd edition. 21 + 356 pp. London: Macmillan, 1927. Price 14s. net.

It is pleasant to meet an old friend and find him unaltered. In the case of a second edition, where very little has been changed or added, the pleasure is marred by doubt whether the little that has been done was worth the trouble of doing it. Dr. Levy's study of the British trust movement is as good in 1927 as it was in 1909, when the present writer read the first German edition. It is, however, far less epoch-making. We rise from it with the feeling that our author said what he had to say in 1909, and that he has nothing more to give us. This may seem ungracious in view of the fact that Dr. Levy is the one writer who really has said *something* about British combinations. It is, however, precisely the fact that he seemed in 1909 to understand us so much better than we understood ourselves, which makes us regret that in the meanwhile he has added so little to the foundation which he then laid.

For this, no doubt, the war is partly responsible. More still, however, our own deficiencies. We have to confess sadly that Fitzgerald writing in 1926 stands in the main where Macrosty stood in 1907. He has different facts to review but no better apparatus for reviewing them. And as in 1907 with Macrosty, so to-day with Fitzgerald, it is pretty nearly a case of "*ceteri desunt*." The more regrettable is it that where Fitzgerald and Levy clash, as in their different attitude to the influence of concentration, the encounter is so halting and inconclusive. Fitzgerald might have estimated more highly the honour of breaking a lance with Levy; Levy might have said: "At last someone has challenged me: I will settle, definitively, with him."

In conclusion we will note three directions in which it seemed possible for Dr. Levy to extend or deepen his study, and which have not in fact been taken. The first is the detailed study of output, costs, and prices under competition, semi-monopoly, and monopoly respectively. This is a line worked not unsuccessfully by Jenks in regard to certain American Trusts as much as thirty years ago. We think that in seventeen years Dr. Levy might have made some advance here. Secondly, an ampler discussion of the relation between combination and the security of capital investment. Does combination in some cases lead to larger capital investment, to more rapid technical progress, than competition? Does its cost curve lie, as regards long periods, substantially below a competitive supply curve? There are scattered passages which suggest that Dr. Levy

takes this view, but it receives no considered or consecutive elaboration. Thirdly, the part played by personality. Many, perhaps most, combinations have "big" men behind them, and to write their history without introducing these personalities may not improbably be—to leave Hamlet out of the cast. H. O. M.

6.—*The Physique of Women in Industry: a Contribution towards the determination of the optimum load.* Report No. 44 of the Industrial Fatigue Research Board. vi + 142 pp. London: H.M. Stationery Office. Price 5s. net.

In the Factories (No. 2) Bill, 1926, that the present government hope to introduce shortly, a clause has been proposed allowing the Secretary of State to prescribe the maximum weight of load that may be lifted by women or young persons of any age either generally or in specific occupations. In these circumstances the Home Office made request to the Medical Research Council that the actual load that can be lifted or carried by women and young workers under industrial conditions without injury or discomfort should be the subject of scientific enquiry. This report of the Industrial Fatigue Research Board gives the result of such investigation. Three lines of enquiry were followed. In the first place, anthropometric data were collected of some 4,000 women engaged in different occupations. (As a control group women students in Glasgow were utilized.) Secondly, the physiological cost of the various modes of carriage to the individual worker were carefully studied under laboratory conditions. Lastly, a Medical Inspector of Factories (Dr. Sybil Overton) acting for the Home Office made a series of observations of the actual loads carried in different industries throughout the country. It is the first section, the anthropometric data, that has, perhaps, the most interest for the statistician. Already existing information as to women, of which a summary is given, is slight. The material obtained in this enquiry was quite substantial, and particulars were secured of age, weight, height, length of arm, distance of finger-tips from ground, and the results of three strength tests—"lumber pull," "hand grip," and "arm crush." The women examined were all volunteers. A great number of correlations were carried out between the various factors, but no very significant relation was found. As one would expect, the very heavy trades secure the best developed women, but whether by a process of original selection or by elimination of the unfit it is impossible to say. If the physical characters are to be taken as criterion in determining the average load to be carried, then the average woman according to these anthropometric data weighs 110 pounds, is 62 inches tall and has a pull of 183 pounds, a grip of 58 pounds and a crush of 50 pounds. The optimum load for such a woman, as deduced from the experimental work carried out in the laboratory, is about 35 per cent. of the body weight, but naturally a considerable amount depends upon the mode of carriage adopted by the bearer. For instance, any load which brings about any considerable departure from the erect posture leads to a high physiological cost.

The demands made by several methods of carrying were explored, and it is interesting to observe that the old method of yoke-carrying is physiologically the most economical.

Dr. Overton in her field enquiry found that where choice of weight is available to the operative, women are usually self-protective, but young persons of both sexes, particularly males, attempt to lift and carry too heavy loads. At a time of life when growth has not ceased and the skeletal form is liable to malformation this is especially to be avoided, and the authors suggest that fairly low limits should be fixed for young persons. The numbers available in Dr. Overton's investigation were limited, and some of her conclusions must be studied cautiously by reference to the figures upon which they are based.

The report has been carefully drawn up and gives a sound answer to a question of much practical importance. In modern industry the pace is often set by machines. If the load can be selected by the operative, then, except with some young persons, self-protection may be a sufficient restriction. Where the load is fixed, a scientific criterion of the optimum becomes more important. Owing to the selective influence of varying trades (selective of physique in the operatives), a general limit would probably be unwise and limits for specific occupations would seem necessary. A. B. H.

7.—*Industrial Prosperity and the Farmer.* By Russell C. Engberg, with the aid of the Council and Staff of the Institute of Economics. xiii + 286 pp. New York: Macmillan. 1927. Price 10s.

This book deals with a very intricate problem, whose statistical study is made especially difficult by the intimate interdependence between the general business cycle on the one hand, and the ebb and flow of agricultural prosperity on the other. Neither can be isolated without seriously vitiating the results of the investigation. Mr. Moulton's statement, in the Director's Preface, that the author seeks to answer "one half of the question, namely, whether the general business cycle exerts an important direct influence upon agriculture," without attempting to elucidate the influence of agricultural conditions on the course of general business, appears, therefore, rather baffling. It is the reviewer's contention that such an elimination of one of the two closely correlated sets of influences is purely arbitrary and that it cannot fail, ultimately, to compromise the results of the investigation. This applies with especial force to the problem discussed by Mr. Engberg, since, even by *a priori* reasoning, it is clear that the direct influence of the prosperity of the agricultural industry on the general business cycle, in all countries possessing a considerable farming population, is in the nature of things far more pronounced than the inverse influence of the trade cycle on the conditions of agriculture. The difference in the elasticity of demand for agricultural products on the one hand, and of manufactured goods on the other; the influence of seasons; the systems of farming in use, which lend themselves to more or

less easy adaptation to changing requirements—all this tends to reduce the influence of the general business cycle on farming very nearly to vanishing point. Only protracted dislocations in general economic conditions, due to wars, social or political upheavals or great industrial revolutions, are necessarily reflected in the basic industry of mankind. Their traces remain on the face of the agricultural industry for decades or even generations, irrespective of the passing whims which affect the course of trade in the meantime. It is, indeed, a curious feature of Mr. Engberg's book that, in the first chapters, dealing with the peculiarities of the agricultural industry, he appears perfectly aware of all this, with the result that this part of his work would make excellent reading for a first-year student of economics, helping him to familiarize himself with the peculiar nature of farming. This initial part of the book, as a matter of fact, says practically all that there is to say on the particular aspect of the problem dealt with at length in the following chapters. To speak plainly, it clearly demonstrates the futility of the laborious calculations of coefficients of correlation and variation, "corn-hog ratios," etc., with which the rest of the volume is filled. After rambling, with the author, through a tedious maze of needless technicalities, the reader ultimately finds himself landed in the safe harbour of conclusions which were perfectly obvious to him from the beginning. The impression of futility is much helped by the expedient of printing in italics the principal points of the argument: a collection of platitudes surprising in a book which purports to represent the results of independent research.

The choice of the period for investigation is also open to criticism. Recent agricultural conditions in the United States can hardly be considered normal, since the after-effects of the war and of inflation on farming could not have spent themselves in so short a time. The financial legacy of the artificial boom, like that of the Napoleonic wars on English farming, is likely to make itself felt for at least a generation, until the liabilities incurred during the inflation are finally written off and agriculture adjusts itself to new conditions. In fact, it is a matter of serious doubt whether, indeed, the refusal of the agricultural industry to follow the course of general business, if considered in its broader aspect, against the historical background, does really give rise to any question at all, or require any special explanation.

The book, as a whole, is rather disappointing, the more so that it is published under the auspices of an institution established "with the sole object of ascertaining the facts about current economic problems and of interpreting these facts for the people of the United States in the most simple and understandable form." In fact it belongs to a class of books with regard to which the pertinent question may be raised whether in these productions modern statistical methods are not misapplied, with the result that an over-luxuriant growth of elaborate statistical calculations and formulæ tends to take the place of original work by a keen, searching mind. Thus wrongly used, even the most promising statistical methods may

prove more prolific of spurious "research" than successful in advancing economic science towards its final goal of *rerum cognoscere causas*.
G. A. P.

8.—*The International Accounts*. By Cleona Lewis. x + 170 pp. London: George Allen & Unwin. 1927. Price 10s. net.

This book is a publication of the Institute of Economics of the Carnegie Corporation, and has been compiled with the aid of the Council and Staff of that body as, according to the sub-title, "a constructive criticism of methods used in stating the results of international trade, service, and financial operations." A history is given of pre-war and post-war investigations and their purposes. The author then discusses the kinds of accounts that should be prepared; first, a "Balance Sheet, or Statement of Foreign Debts and Investments," second, the "International Income Account," and, third, an account of "Current Capital Transactions." The British, League of Nations, and Department of Commerce Statements are examined as instances of current usage. A sample form is sketched out and some of the data analyzed. The Board of Trade annual statement of the "balance of trade" belongs to the second form of account and, not being accompanied by the other two, is, says the author, "coming to be regarded as of little practical significance." That statement comes very well from a writer who thinks that the presentation of accounts would be simplified if the terms "debit" and "credit" were left out. As to the "Balance Sheet," is it to be based on first investment or on present value, and how is either to be ascertained for private investments in concerns other than public companies?
H. W. M.

9.—*The War Finance of France: The War Expenditure of France*. By Gaston Jèze. *How France Met her War Expenditure*. By Henri Truchy. xi + 344 pp. Published for the Carnegie Endowment for International Peace by Yale University Press: Price \$3.75. London: H. Milford. 1927. Price 17s. net.

Perhaps the chief fact which strikes a reader of this volume is the contrast between the French and the English way of looking at the financial question. In this country the income tax was doubled in November, 1914, and although the Budget of May, 1915, was strangely weak, Mr. McKenna restored the prestige of British finance by his two taxing Budgets within the following twelve months. In France, however, the Government took an entirely different view of the sacrifices to be asked from different classes of the population. The tax revenue collected during the war "was somewhat less in amount than its expenditure on a peace footing." No precise figures can be given, because, as Professor Jèze writes, the accuracy of official figures is suspect; he admits that his own conclusions may appear "greatly lacking in precision." The French Government borrowed 140 milliards of francs up to the end of 1918 and a further 49,000 milliards in 1919. This gives one of several estimates of France's total expenditure on the war. But there are others, ranging from 120 to 190 milliards; M. Jèze believes

that even the highest estimate falls far short of the actual expenditure in money.

Even in 1923 the Minister of Finance could not give the actual expenditure after 1915, but only the credits sanctioned by the Chambers. M. Doumer, when Reporter of the Finance Committee of the Senate (December, 1920), admitted that "The State has no accounts." Large fortunes were quickly made by lucky or unscrupulous contractors, but the Government, unlike our own, took no effective steps to tax war profits while the fighting lasted. A War Profits Tax was adopted in 1916, but brought in little revenue until 1919. M. Jèze wants to add the cost of restoring the devastated areas to the French war bill, but again there is much doubt about the actual figure. M. Loucheur, when Minister of Industrial Restoration, reckoned the cost at 75 milliards (February, 1919), although M. Dubois, on behalf of the Budget Commission, had just given a minimum figure of 65 milliards. Later, as the franc fell in value, the figure rose, until the claim sent to the Reparation Commission in February, 1921, demanded 139 milliards from Germany. M. Jèze mentions other estimates, such as M. Lasteyrie's 80 milliards in December, 1921, and M. Chéron's 69 milliards in the same week; he comes to the conclusion that "the data officially supplied have no scientific value."

Of course the sums paid in money or goods by Germany must be deducted from the cost of the war to France, and, as M. Jèze observes, many years must pass before we can know the total of these payments. Ought not an allowance to be made for the capital value of the territory in Europe and Africa taken from Germany under the Peace Treaties? M. Jèze sees that Article 231 of the Treaty of Versailles, by which Germany was forced to accept all responsibility for the war and its damage, "is a hindrance to the payment of reparations"; not that Germany would have paid cheerfully in any case, but the Treaty "provided her with an excellent ground for resistance." France had certain paper assets at the end of the war in the shape of her advances to the other allies; M. Jèze gives them all up as bad debts.

In the second part of the volume Professor Truchy offers an apology for the timid financial policy pursued by successive French Governments; Professor Jèze has already condemned it as "a model of what *should not be done*." Doubtless it was extremely difficult for the French Government to raise money at all in the early months of war, when Paris was threatened, except by printing notes. But the inevitable results followed—higher prices, and, later, private as well as public extravagance. M. Jèze reveals extraordinary laxity in the granting of advances to contractors, who obtained them on demand and without having to pay interest.

Two principal excuses are given by Professor Truchy for his Government's failure to increase taxation during the war. France started with a financial system singularly unsuited for war. Even in peace time her Budgets had seldom balanced; Frenchmen disliked the new income tax, which was not yet working, and objected

strongly to the necessary condition of an effective tax—"personal taxation based on statutory declarations." The yield of the existing taxes was, until 1917, less than before the war. Down to the end of 1919 M. Truchy calculates that permanent budgetary revenue brought in 32.1 milliards and exceptional receipts (tax on war profits and sale of stocks) another 2.6 milliards; the balance of 175.5 milliards was obtained from loans. The second and sounder excuse is that some of the most productive areas, especially those supplying iron and coal, were occupied by the enemy. But French Governments could not plead that they had tried to tax and failed. Did not the Minister of Finance say in December, 1914, "we propose neither to create new taxes nor to increase existing taxes"? It was only when spurred on by the Chambers that the Government tried to increase its permanent revenue.

It is true that the Chamber of Deputies turned down M. Ribot's proposal (May, 1916) to double the old direct taxes. As a result, the French Parliament did not even provide during the war permanent revenue to cover the interest on loans, which is surely the minimum; and there arose the same kind of spending mania which we experienced in this country. Since the war, taxation has been increased very largely, and M. Truchy argues that Frenchmen with incomes above £1,000 a year now pay a heavier income tax than Englishmen. It is true that their assessment is heavier, but do they pay the legal rates? Is evasion as difficult as it is here? Property-owners appear to pay, but the professional classes are much under-assessed and the tax on wages, although only high rates of wages are affected, is not seriously collected. Land, too, is very much under-assessed; some vine-growers, according to M. Ribot, pay on one-tenth of their profits.

As it was afraid to tax, the French Government had to inflate the currency. Before the war the note issue was 6.8 milliards; by 1919 it had grown to 40 milliards, and in 1925 to 51 milliards. At an early date M. Ribot began to issue Treasury Bills, called National Defence Bonds, to the public. At first these bonds, in denominations as low as 100 francs, carried 5 per cent. interest free of taxes; later the rate of interest was reduced. Altogether 76 milliards were obtained from these bonds. The longer-term issue—National Defence obligations—paying 5 per cent. free of tax and in advance on an issue price of 96½, were less popular, raising only 913 million francs. Four funding loans, all in perpetual Rentes, offered at a discount and free from certain taxes, also gave an effective rate of interest of more than 5½ per cent. Two of the loans were in 5 per cents. at 88 and 88½, the later loans were 4 per cents. at 68.6 and 70.8. Holders escape the special taxes on securities, but must reckon the interest as part of their taxable income. The new Rentes were made available, in 1917, for the payment for the tax on war profits. M. Truchy admits that the war loans gave too high a yield; he contrasts them with the 5 per cent. loans issued every six months by the German Government. It seems strange that Governments in all countries can rely on the courage of their young

citizens, but show little faith in the patriotism of non-combatants when it is a question of money. J. E. A.

10.—*On Stimulus in Economic Life.* By Sir Josiah Stamp, G.B.E., etc. The Rede Lecture MCMXXVII. 68 pp. Cambridge University Press. 1927. Price 3s. net.

When we were very young we were introduced to economic studies through Mrs. Fawcett's *Elementary Lessons*, and the impression there received was confirmed by subsequent reading of the classical economists that the science was very simple and logical through all its complexities, rather rigid, and somewhat out of touch with everyday affairs. It was puzzling, for the economic man was, somehow, not the man we were accustomed to meet in the morning train or even in the City. These crude views were modified by Cliffe Leslie, a writer now unjustly forgotten, and still more by a little book of some 250 pages, *The Economics of Industry*, by Alfred Marshall and Mary Paley Marshall, which the present writer makes bold to claim as still almost the most valuable contribution that has come from those eminent pens. If some economic Rip van Winkle of the early 'eighties were to awake in these later days he would find the economic world greatly changed. On the one hand, he would discover a mass of mathematical argument giving a definiteness to theory which sometimes proved deceptive, and on the other, an expansion of economics into a study of all the phases of human life.

Professor Pigou has lately set forth in detail the views held by many others, that the fundamental causes of industrial fluctuations are psychological, the optimist and pessimist errors of estimation of the future made by business men. Sir Josiah Stamp devoted his Rede Lecture last year to an enquiry into the idea of stimulus in economic life, a purely psychological study far remote from the doctrine of rent or the theory of marginal utility. He sought to distinguish stimulus from incentive and from enlarged scope, and to examine "the change in the *degree* of incentive, the *increment* in incentive." "If conditions are made wider or easier, the same unaltered incentive may serve to achieve larger results, and no increase in that incentive is required—no stimulus to increased or intenser action." A change in the price of the commodity produced or a lower general rate of interest are automatic enlargements of scope within which the same incentive may work. A stimulus may result in a full permanent gain, or in the permanent retention of part of the original gain, or the gain may be purely temporary; the stimulus may be followed by a reaction and return to normal after temporary loss or by a complete or partial permanent loss—the using up of part of a stock of incentive. Repeated "doses" of stimulus may give results which may be similarly classified. Sir Josiah shows his break-away from the old ideas nowhere so clearly as when he says: "The economic life is a complex reaction between a physical world, obeying the laws of physics and chemistry, and living organisms obeying more elusive biological and physiological principles, the whole relationship being worked upon by individual

and mass psychological and 'spiritual' forces." On this one would only say that the statement would be equally true if the word "economic" were omitted.

Sir Josiah examines these "three worlds of law" for evidence as to the working of stimulus, but finds that "we can carry over into the economic field no single type or line of thought." Then, with undue brevity he examines, among economic stimuli, rising prices (where inflation temporarily gives greater profit to the owner working on borrowed capital), changes in demand, and a reduction of super-tax. "The monetary factors in fluctuation, however stimulating, are nearly all of the self-reaction type, and what one gains on the swings to-day is lost on the roundabouts to-morrow." Psychological causes afford a stimulus followed by a full reaction and then a return to normal. Considerable value is attached to rhythm in industry. "The object of controlling monetary policy and the price level is not really to flatten out economic life into a dead level, but to ensure appropriate and ready reaction to changes in output, and to act as a governor so that those changes shall not be cumulative and amplified, and especially that they shall not pass beyond the critical or test point, beyond which the swing is not back to equilibrium, but goes on to complete overturn." This passage requires a great deal of analysis and expansion before it can be accepted safely. One would rather say that all economic changes begin with the movement of goods and that the function of the banking system is to make those movements easier and larger. In "wireless" terms, the banks are amplifiers which make audible the radiations coming from outside. Still, all reasoning from analogy is dangerous. H. W. M.

11—Other New Publications.*

Adam (Hugh Grant). An Australian looks at America: Are Wages really higher? 118 pp. London: Allen and Unwin, 1928. Price 2s. 6d.

[This little book is a reprint of newspaper articles written by the Assistant Editor of the Melbourne *Herald*, for his own paper and the Sydney *Sun*, when he was acting as correspondent to the Australian official delegation sent to investigate American industrial methods. Unlike some who have gone out to see, the writer has not been content to look at what was shown him and believe all he was told. He went about using his eyes, asking questions, and making his own deductions; and has put down the evidence obtained and his conclusions therefrom in succinct and lively English. The book may be recommended as affording a first-hand impression of the facts as they appeared to a shrewd, practical and sincere enquirer. The main thing that emerges is that, owing to the amount of short time and the high cost of living, real wages are less high in the United States than in Australia. The comments on the value of certain statistics are of particular interest; it would appear that the well-known readiness of the American business man to answer questions does not necessarily include a care for accuracy in the reply.]

* See also "Additions to the Library," p. 286, *et seq.*

Bellman (Harold). The Silent Revolution. With an introduction by the *Right Hon. Walter Runciman*, LL.D., M.P. 64 pp. London: Methuen, 1928. Price 2s.

[The sub-title, "The Influence of Building Societies on the Modern Housing Problem," describes the general aim of this excellent little book, which originated in an address delivered before the Société Internationale de Philologie, Sciences, et Beaux Arts. Popular knowledge of Building Societies in this country is probably not commensurate with their importance at the present time; and this account of their origin, scope, methods of working, and present position gives all the essential facts in a few pages (which include an index), in addition to recording their share in post-war house-building, and indicating the part they might play in the solution of the housing problem which remains with us.]

Bousquet (G. H.). Introduction à l'Étude du Manuel de V. Pareto, augmentée d'un appendice mathématique du Prof. A. de Pietri-Tonelli. 46 pp. Paris: Marcel Giard, 1927. Price 6 fr.

[An explanatory guide to the *Manuel d'Economie Politique*. After sketching Pareto's career, the author reviews the beginnings and development of the science of mathematical economics, and assesses the value of Pareto's eminent work in relation thereto; the *Manuel* itself is then briefly analyzed and discussed, with a view to assisting students to a right appreciation of Pareto's mathematical and theoretical work and enabling them to find their way through his somewhat vague and difficult exposition of its application to practical economics. Prof. Pietri-Tonelli's Appendix (pp. 37-46), entitled "L'Évolution des équations générales de l'Équilibre Économique," traces the mathematical development of the theory of economic equilibrium from Cournot to Pareto.]

Chisholm (George G.). Handbook of Commercial Geography. 11th edition, revised and edited by *L. Dudley Stamp*. xv + 829 pp. Maps, etc. London: Longmans, 1928. Price 25s.

[The ninth edition of this well-known book was briefly noticed in the *Journal* for July, 1922, two of the earlier editions having been reviewed at length (the fourth edition in the December, 1903, *Journal*, and the first edition in the December, 1889, *Journal*). The present issue has been edited and brought up to date by Dr. Dudley Stamp and, while the plan of the book remains unchanged, certain sections have been rewritten and others have been added. The tables in the Appendix giving the imports and exports of the principal countries of the world have also been re-organised. They now include a pre-war average (1911-13) compared with a typical post-war year (1924), the values being reduced to a gold basis. Figures for the years 1925 and 1926 are also given in the text and, in certain cases, for the earlier months of 1927. The book in its present form is a valuable record of pre-war and post-war conditions and trade.]

Dicksee (Laurence R.). Published Balance Sheets and Window Dressing. viii + 62 pp. London: Gee & Co., 1927. Price 5s.

[Mr. Dicksee's book is based on articles which appeared in the *Accountants' Journal*, and is intended for directors and shareholders, though it should be of value also to accountancy students and auditors. Its object is to enable the shareholder to understand the balance sheets of companies in which he may be interested, and to suggest certain improvements in their construction. The book includes chapters on the uniformity of balance sheets and their statutory forms, reserve funds, secret reserves, and balance sheets and share prices. The author criticizes the Report of the Committee on Company Law Amendment, 1926, the text of which

is given in the Appendix. The suggestion is also made that those responsible for the Companies (Amendment) Bill now before Parliament should give their attention to the present unsatisfactory state of the law in regard to balance sheets.]

Economic Status and Health. A review and study of the relevant morbidity and mortality data by *Selwyn D. Collins*, Associate Statistician, United States Public Health Service. Public Health Bulletin, No. 165, 1927.

[Morbidity and mortality rates from all causes vary with economic status, the relative differences in death-rates being generally greater in infancy than in the adult ages. Such causes as tuberculosis, bronchitis, pneumonia, and accidents vary inversely with economic well-being, while a few causes such as diabetes and gout affect more strongly the wealthier. It does not seem reasonable to assume that the poor have constitutional weaknesses which make them particularly susceptible to one disease and not to others, while it is significant that the diseases about which least is known are the diseases which vary least with the ability to buy adequate medical service. There is a definite rise in infant mortality as poverty increases, but miscarriages, stillbirths, and deaths under one month show little variations in the different economic classes. This fact and the increasing differences in the various economic classes as age increases up to one year point towards environmental influences rather than to constitutional weakness. Probably heredity, selection apart from heredity, and environment all have considerable bearing on the problem of economic well-being and health, but it is not attempted in this examination of the existing data to determine the relative importance of these factors.]

Leroi (René). La Politique Monétaire Anglaise dans l'Inde. 84 pp. Paris : Marcel Giard, 1928. Price 10 fr.

[An able study, by a French Colonial Administrator, of the currency systems of British India during the last hundred years, and of the many efforts that have been made to achieve the stabilization of the rupee. The subject is of especial interest to the French authorities, since the stabilization of the piastre of Indo-China is a problem still to be solved. The book includes a useful bibliography.]

McBain (A. G.). Complete Practical Income Tax. 3rd edition. x + 262 pp. London : Gee & Co., 1927. Price 7s. 6d.

[Both the earlier editions of Mr. McBain's book were briefly noticed in the *Journal* on their publication, the first in the January, 1926, *Journal*, and the second edition in Part I of the 1927 *Journal*. The present edition includes the provisions of the Finance Acts of 1926 and 1927, and numerous examples are given of the changes caused thereby. The book also contains some useful information on the new method of calculating the liability to income-tax and to surtax, which comes into operation this year. Changes incidental to recent Case Law or Inland Revenue rulings have also been noted. There is a good index.]

Mostafa Khan Fateh. Taxation in Persia : a synopsis from the early times to the conquest of the Mongols. 21 pp. 1928.

[A brief outline of the systems of taxation in force in Persia during four distinct periods of its history, ranging from 558 B.C. to A.D. 1230. Geographic and climatic conditions of the country have been favourable towards continuity in its revenue systems, which have remained much the same from the earliest times. Particulars are given of the methods of assessment and collection of the land-tax, which has always been the most important source of revenue, of the poll-tax, and of other fiscal measures.]

Carter (Roger). Murray and Carter's Guide to Income-Tax Practice. 11th edition. liv + 544 pp. London: Gee & Co., 1927. Price 30s.

[Two of the earlier editions of this work have already been briefly noticed in the *Journal*, the seventh edition in the *Journal* for July, 1915, and the tenth edition in the *Journal* for March, 1925. The present (eleventh) edition includes an account of the considerable changes brought about by the Finance Acts of 1926 and 1927, and by the extension of super-tax to the undistributed profits of companies; but its bulk has been kept within limits by the exclusion or abridgment of illustrative quotations of legal arguments and decisions available elsewhere. There is a good index.]

Northcott (C. H.), Sheldon (Oliver), Wardropper (J. W.), and Urwick (L. J.). Factory Organization. With a Foreword by Professor J. H. Jones. xii + 252 pp. London: Pitman, 1928. Price 7s. 6d.

[This volume consists of a series of articles on various phases of factory management by four university men who are engaged in different fields of activity in one of the principal industrial establishments in this country. The subjects discussed include the lay-out of a factory, the organization of business control and of production, the relations between employers and employees, marketing and advertising, selling and transport, and records and costing. In each case the writers demonstrate the value of the application of systematic methods to industry in its various phases, and the book should be of value to the manufacturer and to the student. A bibliography and an index are included.]

Padalino (Francesco). Integrality. 126 pp. New York: Integrale, 1927.

[The author presents here a series of notes on scientific method, indicating in his preface that "the spartanic brevity with which we express our thoughts will cause our notes to appear little related to each other," nevertheless "Those exceptionally intuitive minds who prefer suggestions to exhaustive explanation may find that, although we do not proceed along the usual smooth tracks but jump from one orbit to another, yet all these orbits belong to the same fundamental system." The author gives a table which may be of interest to readers of the *Journal* in which he sets forth the results of enquiries made in New York City and addressed to 71 persons from various parts of the world as to what men cared for most. Those submitting to the test were asked to place in order of preference the following, which are, on the average, in the order found:—Self, Children, Wife or Husband, Honour, Property, Country, Justice, Religion, Art and Science, Humanity, Political Ideals.]

Simons (A. J.). Holding Companies. vii + 191 pp. London: Pitman, 1927. Price 10s. 6d.

[The book, which is intended as a text-book for accountants, deals at length with the finance and control of holding companies, their origin and economic foundation, and their future possibilities. Numerous examples of the published balance sheets of British and American companies are given and analyzed. Attention is also drawn to the dangers and abuses of holding company organizations, and to their position in relation to income-tax, which is at present somewhat indefinite.]

Transvaal Chamber of Mines. Gold of the Rand: A great national industry (1887–1927). 160 pp. Johannesburg, 1927.

[This second edition of a publication originally issued by the Transvaal Chamber of Mines in 1924 gives a short history of the Witwatersrand

Gold Field from the time of its discovery, in 1886, up to the present day. It describes the methods of obtaining the gold, the expenditure on stores and supplies compared with that of other mining fields, and the measures taken by the mine management for the health and well-being of their employees. The book also deals with the Rand's water supply, the methods and costs of marketing and transporting the gold, and shows how the development of the Transvaal Coal Mining industry has been incidental to the growth of gold mining.]

Walton (Victor). Income-tax, Super-tax, and Surtax. The new law explained. xviii + 220 pp. London: Pitman, 1928. Price 7s. 6d.

[The changes which have taken place in the laws of income-tax, super-tax and surtax, owing to the passing of the Finance Acts of 1926 and 1927, are here enumerated. The old provisions are clearly explained and contrasted with the new, and practical examples are given of particular cases under each schedule. The book also includes a full explanation of the 1926 agreement between the British Government and the Irish Free State, and its relation to the Finance Act of that year.]

Yves-Guyot. La Science Economique: ses lois inductives. 6th edition. 428 pp. Paris: Alfred Costes, 1928. Price 20 frs.

[Two of the earlier editions of this book were reviewed at length in the *Journal*, the second in 1887 and the third in 1907. The present edition, which was published on the day of the venerable author's death, has been revised and enlarged by several chapters dealing with financial and economic questions that have arisen as the result of the war. These new portions are written with all M. Guyot's characteristic vigour of statement and clarity of language.]

CURRENT NOTES.

The figures of British foreign trade during the first three months of this year are, on the whole, encouraging. In comparison with last year, the imports lack those special elements which were the result of the long stoppage in our home coal production in 1926. Deliveries of foreign coal, which continued to affect trade in the first quarter of 1927, practically ceased after that time, while the supplies from abroad of crude iron and steel, which continued after deliveries of foreign coal had ceased, are now arriving on a reduced scale. The total value of British Exports has, so far, been greater in each of the months of 1928 than in the corresponding month of 1927, and though March showed the smallest excess, it must be recalled that a flush of post-stoppage deliveries probably inflated the exports of March last year, and in the next month or two comparisons will be subject to a similar consideration. Coal exports were a million tons less than in the first three months of either 1927 or 1926, a falling off of about 8 per cent., while their aggregate value was more than 25 per cent. below that recorded a year ago, and 20 per cent. below the figure of two years ago. It is a favourable feature that exports of iron and steel and manufactures of those metals amounted in tonnage almost to the figure of 1926 and were over 28 per cent. in excess of last year's total. Last year the import tonnage was about 80 per cent. greater than the export tonnage in the first quarter of the year. This year the three months' imports were little more than last year's exports, and consequently well below current exports once more. Imports of crude steel have continued on a scale somewhat greater than that of two years ago, though showing a reduction of 40 per cent. on last year's total. If we consider other iron and steel goods, omitting the crude iron and steel from the total of the iron and steel group in the official accounts, it will be found that the tonnage exported this year in the opening three months was greater than in the like period of 1926, even if only by about 20,000 tons. At the same time, imports of such goods, though one-third less than last year, were over 40 per cent. greater

in tonnage than two years ago, mainly owing to continued relatively large imports of semi-finished material. Exports of cotton piece goods were somewhat greater in yardage than last year, though short of the 1926 total. Printed and dyed cloths show larger figures than in the first quarter of either 1927 or 1926, greys show a partial recovery from the low figure of last year, while bleached and coloured cottons were short on exports as compared with either of the last two years. The imports of cotton have had to be supplemented to an important extent by drawing on stocks, which did not occur in the first quarter of either of the two years next preceding.

In our usual table we again select for comparison with the totals for the last twelve months the figures for twelve months ended before the occurrence of the General Strike. Price changes consequently affect the comparison of value totals in an important degree. The excess of imports, amounting for merchandise to £385,000,000 in the earlier twelve months, is reduced to £363,000,000 in the later period ended with March of the current year. The diminution of £22,000,000 is increased by £6,000,000 on account of movements of gold and silver. In this connection it may be noted that the shipment during March of over £15,000,000 in refined gold bars to France was exceptional in character and not an ordinary remittance in connection with the settlement of trade balances. If this were left out of account, the improvement in the visible trade balance would be reduced to £13,000,000.

The comparison of the shipping figures furnishes some curious results. The excess in numbers of vessels entered with cargoes in the foreign trade over those cleared with cargoes in that trade is reduced to the small figure of 321 from 5,455. The movement in ballast must have shown compensating changes. In the latest period the foreign vessels entered with cargoes were 4,630 more than those clearing, while two years earlier, with the same total clearing with cargoes, the number of vessels entered exceeded that cleared by 897 only. Meanwhile the excess of British vessels cleared with cargoes over those so entered was reduced from 6,352 to 4,951. It would appear that, particularly in the case of foreign vessels, fewer ships have been arriving light for the purpose of taking outward cargoes. The British tonnage cleared with cargoes in the last twelve months has been, as two years ago, double the foreign tonnage, but the inward movement shows a larger proportion of foreign tonnage in the later period. The latter change is not a large one, namely, a reduction of the British proportion of the total tonnage inward with cargoes from 68 to 67 per cent.

| Movements and Classes. | Twelve Months ended March 31, 1928. | Twelve Months ended March 31, 1926. | Excess (+) or Deficit (-) in later period. |
|--|--|--|---|
| Imports, c.i.f.— | £'000. | £'000. | £'000. |
| Food, drink and tobacco | 542,099 | 564,908 | — 22,809 |
| Raw materials and articles mainly un- manufactured | 343,957 | 403,885 | — 59,928 |
| Articles wholly or mainly manufac- tured | 316,551 | 315,944 | + 607 |
| Other articles | 5,593 | 5,495 | + 98 |
| Total Imports ... | 1,208,200 | 1,290,232 | — 82,032 |
| Exports, f.o.b.— | | | |
| <i>United Kingdom Produce and Manufactures—</i> | | | |
| Food, drink and tobacco | 53,073 | 53,442 | — 369 |
| Raw materials and articles mainly un- manufactured | 74,345 | 80,215 | — 5,870 |
| Articles wholly or mainly manufac- tured | 576,815 | 603,557 | — 26,742 |
| Other articles | 16,336 | 17,077 | — 741 |
| <i>Imported Merchandise—</i> | | | |
| Food, drink and tobacco | 26,461 | 31,109 | — 4,648 |
| Raw materials and articles mainly un- manufactured | 72,920 | 90,838 | — 17,918 |
| Articles wholly or mainly manufac- tured | 25,304 | 29,102 | — 3,798 |
| Other articles | 177 | 97 | + 80 |
| Total Exports ... | 845,431 | 905,437 | — 60,006 |
| Bullion and Specie— | | | |
| Excess of Exports over Imports | 8,844 | 2,920 | + 6,024 |

| Movement of Shipping in the Foreign Trade— | Number of Vessels. | Thousand Net Tons. | Number of Vessels. | Thousand Net Tons. | Number of Vessels. | Thousand Net Tons. |
|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| <i>Entered with cargoes—</i> | | | | | | |
| British | 33,087 | 40,309 | 32,087 | 38,074 | + 1,000 | + 2,235 |
| Foreign | 26,599 | 19,864 | 22,866 | 17,623 | + 3,733 | + 2,241 |
| Total entered ... | 59,686 | 60,173 | 54,953 | 55,697 | + 4,733 | + 4,476 |
| <i>Cleared with cargoes—</i> | | | | | | |
| British | 38,038 | 42,585 | 38,439 | 41,443 | — 401 | + 1,142 |
| Foreign | 21,969 | 21,073 | 21,969 | 20,778 | — | + 295 |
| Total cleared ... | 60,007 | 63,658 | 60,408 | 62,221 | — 401 | + 1,437 |

The calculations of the Board of Trade with reference to the effect of price changes on the foreign trade totals of value, such as are shown in the preceding table, result in a computed increase in volume of imports, comparing the two periods dealt with in the preceding table, of 3.4 per cent., an increase of 5.4 per cent. in volume of British exports and a decrease of practically 8 per cent. in the volume of re-exports. The fall of prices has amounted in the case of exports to 9.5 per cent. on average, and in the case of imports to 9.8 per cent. The changes in the case of articles with which our re-export trade is concerned have resulted in a greater average fall than in the case of imports as a whole, namely, a fall of 11.2 per cent. With these changes in very different aggregates of goods may be compared the average fall of 8.4 per cent. shown by the Board of Trade Index of Wholesale Prices, which, it will be remembered, is weighted on a scheme based on home trade, and thus different from that affecting either imports or exports. The divergence of results does not of itself, accordingly, suggest any conflict of data.

As measured at the Board of Trade, wholesale prices in January were, on the average, higher than in December by 0.5 per cent., the index-numbers for the two months being 84.9 and 84.5 respectively (1924 = 100). The January index for food showed a rise of 1.4 per cent., due chiefly to an increase of 2.4 per cent. in meat and fish prices, while that for industrial materials showed a fall of 0.2 per cent. Average prices during February were somewhat lower, the total index-number for that month being 84.4. The average for the three food groups showed a fall of 1.1 per cent., cereals having cheapened by 0.6 per cent., and meat and fish by 4.9 per cent., while miscellaneous foods became dearer by 1.8 per cent. In the industrial group, where the average fell by 0.5 per cent., the greatest changes were in textile materials, cotton showing a fall of 2.3 per cent. and other textiles a rise of 1.7 per cent. The figures of 84.9 and 84.4 for the general index-number for the first two months of the year compared with an average of 85.1 for the whole of 1927, and it may be noted that from March of that year the general index-number was below 85, except for the three months June, September and October.

Thanks to sharp downward movements in the prices of a limited number of commodities, particularly pork, tea, sugar, butter, Egyptian cotton, tin and petroleum, the *Economist* index-number of wholesale prices for the end of January showed a decline to 176.7 from 179.3 at the end of December. The figure for the end

of January was lower than that for any month of 1927, and reduced the increase in the total index-number over that recorded for the end of July, 1914, to 51·5 per cent. In this latter average the highest component was the index for foodstuffs other than cereals and meat, which were still 95 per cent. above their pre-war level, while the lowest was the index for minerals prices, which at 31 per cent. above the pre-war level was lower than for several years past, and compared with an increase of 58 per cent. at the end of January, 1927. Minor changes of a widespread character operating during February raised the general index-number for the end of that month to 178·2, but the minerals section, thanks to the steady drop in tin in the preceding few months, established a new low post-war record at a level of only 28 per cent. above that of July, 1914.

The slight downward movement in the *Statist* index-number of wholesale prices which became evident in the final month of 1927 was accelerated in the first month of the current year. At the end of January this index-number stood at 120·9, as against 121·4 a month before, the outstanding feature of this movement being the drop of prices in the minerals group. There was a slight recovery in the general level during February, but at the end of the month the level, as measured by 121·1, was still below that at the end of 1927. The recovery was due to higher prices in the foodstuffs group and in the textiles group, while movements in the minerals group were again almost wholly downwards.

On February 1 the average increase over the July, 1914, level in the retail price level of foodstuffs in Great Britain and Northern Ireland, as measured by the Ministry of Labour, was 59 per cent., and on March 1 it had fallen to 55 per cent., as compared with 62 per cent. a year before. The decrease in the two months was due not only to such seasonal movements as reductions in the prices of butter and eggs, but also to lower price levels for fish, flour and bread, and meat. The increase in the general level of retail prices, including food, rent, fuel and light, and miscellaneous items, which stood at 68 per cent. on January 1, fell to 66 per cent. on February 1, and further to 64 per cent. on March 1. From the fact that the food items accounted for 60 per cent. of the total family budget in July, 1914, one can deduce that the average level of the prices of other items included in the budget remained for the first two months of the year at approximately 77 per cent. above the July, 1914, level. The estimated increases for the principal groups on March 1 were 51 per cent. for rent and rates, 115 to 120 per cent. for clothing, and 70 per cent. for fuel and light.

The following table summarises for the principal countries the latest information as to retail prices overseas as reproduced in the *Labour Gazette*. The third column gives the percentage increase in retail food prices on those ruling in July, 1914, or some similar pre-war period; the fourth column gives the estimated percentage increase for all the items covered by the budget in each case, such items, in addition to food, comprising generally rent, clothing, fuel and light, and other household requirements :—

| Country. | Date of latest return. | Food. | All items. |
|--------------------------------|------------------------|----------------------|----------------------|
| | | Percentage increase. | Percentage increase. |
| <i>Overseas Dominions, etc</i> | | | |
| Australia | January, 1928 | 53 | 45 (3rd qr. 1927) |
| Canada | February, 1928 | 50 | 56 |
| India (Bombay)*... | February, 1928 | 46 | 48 |
| Irish Free State ... | January, 1928 | 75 | 77 |
| New Zealand | January, 1928 | 46 | 62 |
| South Africa | January, 1928 | 19 | 32 |
| <i>Foreign Countries.</i> | | | |
| Belgium | February, 1928 | — | 711 |
| Czechoslovakia (Prague) | December, 1927 | 813 | 634 |
| Denmark | January, 1928 | 52 | 76 |
| Egypt (Cairo) | December, 1927 | 47 | — |
| France (Paris) | February, 1928 | 422 | 396 (4th qr. 1927) |
| France (other towns) | November, 1927 | 426 | — |
| Germany | February, 1928 | 51 | 51 |
| Holland (Amsterdam) | December, 1927 | — | 70 |
| Italy (Milan) | December, 1927 | 413 | 431 |
| Norway | February, 1928 | 70 | 94 |
| Spain (Madrid) | November, 1927 | 125 | — |
| Sweden | February, 1928 | 53 | 71 (Jan.) |
| Switzerland | January, 1928 | 59 | 61 |
| United States | January, 1928 | 52 | 72 (Dec. 1927) |

* Native families.

With reference to statistics relating to employment in Great Britain and Northern Ireland, quoted on p. 117 of Part I of the *Journal*, the *Labour Gazette* reported that, following the sharp decline which occurred immediately after Christmas, employment showed a steady improvement, on the whole, throughout January, and this continued during February, particularly during the second half of the month. Among the workpeople (aged 16 to 64 inclusive and numbering approximately 11,800,000) insured against unemployment under the Unemployment Insurance Acts in Great Britain and Northern Ireland, the percentage unemployed (including those temporarily stopped as well as those wholly unemployed), in all industries taken together, rose from 9·8 on December 19, 1927, to

10.7 on January 23, and thereafter declined to 10.4 on February 20, as compared with 10.9 on February 21, 1927. The total number of applicants for employment registered at Employment Exchanges on December 19 was approximately 1,127,000; on January 30 this had increased to 1,199,000, but by February 27 it had fallen again to 1,139,000, which was below the figure of a year before, viz. 1,208,000 on February 28, 1927.

Official statements as to employment in Germany, as summarised in the *Labour Gazette*, show that during December there was an unexpectedly heavy increase in the number of unemployed applicants at employment exchanges, but these came predominantly from seasonal occupations, and the seasonal decline in the demand for labour came practically to an end by the middle of January. The number of persons in receipt of benefit in respect of total unemployment rose from 751,760 on November 30 to 1,399,746 on December 31, and further to 1,547,944 on January 31. Trade union returns, based on a total membership of over 4 million, gave a percentage of unemployment of 7.4 on November 26, rising to 12.9 on December 31, and receding to 11.2 on January 31, as compared with 16.5 a year before. In France the total number of unemployed persons remaining on the "live register" of the Exchanges rose from 26,292 at the end of December to 32,849 on January 28, then fell again to 28,942 on February 25. In the case of Norway the trade union percentage of unemployment rose from 21.6 at the end of November to 24.5 at the end of the year, but this latter figure still compared favourably with that at the end of 1926, viz., 28.5. For Swedish trade unions returns are quoted by the *Labour Gazette* up to the end of 1927, when the percentage of unemployed was 18.6, as compared with 12.5 a month before, and 19.1 a year before. In the third Scandinavian kingdom, returns supplied to the Danish Statistical Department by trade unions and by the Central Employment Exchange gave as the percentage of unemployment at the end of January the high figure of 30.3, but this was a slight improvement on the figure for a month before (30.5) and also on that for a year before (31.6).

In Canada the index-number of employment is based upon returns received from over 6,200 firms employing approximately 840,000 workpeople, and has as its base the volume of employment during the week ending January 17, 1920. Standing at 106.8 on December 1, this index-number fell to 99.5 on January 1, then rose to 100.8 on February 1, as compared with 95.4 on February 1,

1927. Canadian trade union returns gave the percentage of unemployment as 5.2 at the end of November, and by the end of January this had risen to 6.8. The monthly report on employment issued by the Federal Department of Labour Statistics at Washington is based upon returns received from nearly 10,800 establishments in 54 of the principal manufacturing industries employing about 3 million workers. If the monthly average index-number of employment in these industries in 1923 be taken as 100, the corresponding figure for December was 85.1, and that for January was 84.2, as against 89.4 for January, 1927.

M. Camille Jacquart, in a study entitled "l'influence de la guerre et d'autres événements calamiteux sur la masculinité dans les naissances" (originally published in Vol. XXII of the *Bulletin de la Commission Centrale de Statistique*), comes to the conclusion that after times of war or of economic and social crises in European countries there is an abrupt but temporary change in the sex ratio, the number of males rising distinctly above the normal level. At such times there is, first, a lowering of the marriage rate and birth rate followed by a renewal of normal, or often abnormal, sexual activity; and this renewal usually has the effect of changing the customary distribution of marriages and births over the calendar year. The war is only the indirect cause of the increase of male births, in producing this interruption in "la marche normale de la nuptialité et de la fécondité des familles." If the war is not of long duration or does not bear hardly upon the general social life of a nation—as in the Franco-German war of 1870—no change in sex ratio is observed.

No change occurs in the ratio amongst illegitimate births, or amongst still-births, the latter suggesting that the increase of males is not the result of a diminution of miscarriages. It may be that the heightening of the marriage rate increases the number of males through a higher ratio of males to females amongst first born than amongst later born, or the cause may lie (as this author believes) in the alteration in the seasonal distribution of births.

The statistics do not bear out the beliefs that longer intervals between pregnancies or physiological changes in fertility are responsible factors.

The latest issue of the *Annals of Eugenics* (Parts III and IV of Vol. II, October, 1927) contains two papers on goitre and thyroid enlargement by Dr. Percy Stocks. One of these, based on the records of the administration of iodine to 1,130 girls of the Mädchen-

sekundarschule der Stadt Bern, for upwards of three and a half years from March, 1923, suggests that iodine administration reduces the goitre and gives goitrous girls a pronounced increase in height and in weight. The other publishes for the first time some data obtained in the 1924 survey by the Medical Department of the Board of Education of the prevalence of goitre. It is known that increasing urbanization is associated with increased cancer mortality and decreased mortality from thyroid diseases and enlargements. By considering large towns, boroughs and urban districts and county areas separately, and after correcting for population, etc., Dr. Stocks finds that there is a correlation of order $\cdot 2$ to $\cdot 3$ between the total cancer mortality and prevalence of thyroid enlargement in children of large towns in England and Wales, and a correlation of order $\cdot 2$ between the rate of thyroid enlargement in girls and the death-rate from cancer of the uterus in married women of 45-64.

A further instalment is given of the investigation on Jewish children, this time with especial relation to ocular characters. Boys with extremely light or dark fundi seem to have less than the mean intelligence of the population. Defects of sight are not a fundamental factor in determining educational dullness. In certain low types—generally the product of heredity—poor mentality is closely linked with poor physique, and this poor physique extends not only to the organs of perceptual judgments but to the sensory organs.

Dr. Morant contributes a paper on Palæolithic man. He gives 72 measurements (where possible) of each of nine skulls (or casts), and plates of these in five different aspects (facialis, lateralis right or left, verticalis, basalis and occipitalis). He concludes that Mousterian man was a homogeneous type, specifically different from modern man and equally related to all races of *Homo Sapiens*. The remaining paper, on tobacco amblyopia, is primarily of medical interest.

The award of the Buchanan Medal to Dr. Greenwood by the Council of the Royal Society, mentioned in our last Current Notes, has been followed by the inclusion of his name in the list of those selected by the Council for election to the Fellowship of the Royal Society. This double recognition of the work of their Honorary Secretary, a recognition of the value of purely statistical work which reflects honour on their own Society, will, we feel sure, give the greatest pleasure to Fellows. It has fallen at a particularly

happy time when Dr. Greenwood has just taken up his duties as Professor of Epidemiology and Vital Statistics at the School of Hygiene and Tropical Medicine, though that School has not yet entered on the occupation of its permanent home.

The Frances Wood Memorial Prize is offered for competition again this year for the best investigation, on statistical lines, of any problem affecting the economic or social conditions of the wage-earning classes. Essays must be received on or before October 31st. Further particulars may be obtained from the Assistant Secretary.

OBITUARY.

YVES GUYOT (SEPT. 6, 1843–Feb. 21, 1928).

ORDINARY member from 1887, honorary from 1908, Yves Guyot has been known and respected in this Society for over forty years. At the time of his death he was editor in chief of the *Journal des Economistes*; and the March number of the paper contains contributions from him, so suddenly had come the end of a life of untiring energy. The same number gives a good portrait and a full and sympathetic account by Dr. Louis Fiaux of his friend's career. Signor Giretti's affectionate sketch in *La Riforma Sociale* (March–April) is a good supplement. Yves Guyot was born at Dinan, of Breton parents. He was sent to the *lycée* at Rennes where his father practised as a barrister. He seems to have profited less by the school (where he quarrelled with his teachers) than by his father's library. The family pressed him to follow law, but he preferred (at 21, 1864) to follow journalism and go to Paris. His bent at that time was towards mechanical invention, especially aeronautic, and also towards the study of Diderot, which led to his first book (on Diderot). The second book was *The Inventor*, which displayed many of the qualities of style and thought afterwards deemed characteristic of him. As a declared Republican, he was denied Government employ, and threw himself the more ardently into journalism and political agitation. He became known to Leroy Beaulieu, Ribot and Gambetta. Editor at Nîmes of *L'Indépendant du Midi*, he endured persecution and removed to Paris, into the service of the *Rappel*, and later of the *Lanterne*. He was in fact a fighting republican of the old school. During the Commune of 1871 he ran some risks in attempting a conciliation of all progressive parties and in saving some public buildings from the fire. In 1873 he wrote a *History of the Proletariate*, and *Studies on the Social Doctrines of Christianity*, afterwards translated by Bebel. Elected to the Municipal Council of Paris in the days of Macmahon, he of course ran counter to Macmahon. He threw himself into measures of municipal reform, the curbing of the *police des mœurs*, the imposition of a tax on capital rather than on income, attacks on public scandals of all sorts—encountering sometimes fierce physical opposition. A new period began when he was elected to Parliament

for Paris, in 1885. He was Minister of Public Works in the governments of Tirard and Freycinet. and lost his seat to Goblet in 1893. In 1881 appeared his most elaborate economic work, his *Science économique et ses lois inductives*; and in 1883 he began a series of novels, *La famille Pichot*, *scènes de l'enfer social*, *Un fou*, *Un diôle*, all indirectly didactic. The treatises on Prostitution, the Police, Colonial Policy, Letters on Madhouses, go more directly to work, and the same may be said of *La tyrannie socialiste*, 1893, *La comédie protectionniste*, 1905. He was a stout Free Trader, and was honorary member of the English Cobden Club from 1879. He founded the *Ligue du libre échange*. He procured the abolition of octrois throughout France. His labours over the conditions of Peace were undertaken long before the Great War had come to an end. His book *Causes and Consequences of the War* was issued (his French biographer tells us, p. 315) in 1915. It is interesting to note that he attaches little importance to the reduction of armaments as compared with the suppression of what he counts the more profound causes of war. His idea of the conditions of peace do not err on the side of leniency.

Among his English friends were Stansfeld, Jacob Bright, James Stuart, Josephine Butler; and from that list a contemporary Englishman would infer the type of English radicalism that would seem to fit him. He was the unselfish champion of unpopular causes.

We must all admire the long record of public service rendered by our eminent member in the face of far harder obstacles than are usually encountered on this side of the Channel. It would be ungenerous to dwell on the inevitable result of absorption in public life and to discover that M. Guyot did not always keep pace with the advancement of economic and statistical studies. The difference of surroundings in the case of Prof. Loria, whose *Recollections* have traced the history of his mainly studious life for us a few months ago, brings out the advantage possessed by the studious economist, from this point of view. It would have been surprising indeed if so vehement a nature as Guyot's had allowed itself a large time for arm-chair study.

He was not unmindful of this Society. Not only did he contribute his books, but he gave in May, 1902, a paper on the sugar bounties, "The Sugar Industry on the Continent," for which he obtained the Guy Medal in silver (1903). We counted him one of ourselves.

STATISTICAL AND ECONOMIC ARTICLES IN RECENT PERIODICALS.

UNITED KINGDOM—

Bankers' Magazine—

January, 1928—The banking half-year. Stimulating European industry: *F. G. Culmer*. Banks and "Creation of credit": "*Quebird*."

February, 1928—Bank profits and balance sheets: *Rt. Hon. W. Graham*. Credit and trade in 1927.

March, 1928—The financial and industrial outlook. Banking reform in Japan: *J. Taushima*.

Biometrika. December, 1927—On the frequency distribution of the means of samples from a population having any law of frequency with finite moments, with special reference to Pearson's Type. II: *J. O. Irwin*. The distribution of means for samples of size N drawn from a population in which the variate takes values between 0 and 1, all such values being equally probable: *P. Hall*. The mathematics of intelligence (1). The sampling errors in the theory of a generalized factor: *K. Pearson* and *M. Moul*. Supplementary tables for determining correlation from tetrachoric groupings: *A. Lee*. Further contributions to the theory of small samples: *K. P.*

Economica—

December, 1927—Tariffs and the distribution of foreign trade: *R. A. Lehfeldt*. The explanation of the business cycle: *J. Schumpeter*. The contemporary background of Hobbes' "State of nature": *P. Doyle*. The methodology of the measurement of labour-turnover: *I. Goddard*.

March, 1928—English political economy: *A. A. Young*. The theory of population: *H. Dalton*. Great cities and their economic problems: *E. W. Shanahan*. Mr. Robertson's views on banking policy: a reply to Mr. Harrod: *M. Tappan*.

Economic Journal—

January, 1928 (Economic History Supplement)—The coal-miners of the eighteenth century: *T. S. Ashton*. Urban death-rates in the early nineteenth century: *B. Hammond*.

March, 1928—Unemployment and wage rates: *H. Clay*. The economic effects of advertisement: *D. Braithwaite*. The influence of inheritance on the distribution of wealth: *J. Wedgwood*. Agriculture and the price level: *D. A. E. Harkness*. The significance and use of data in the social sciences: *J. Candler Cobb*. The recent banking crisis and industrial conditions in Japan: *T. Johns*.

Eugenics Review. January, 1928—The fundamental elements of the problems of population and migration: *Sir G. H. Knibbs*.

UNITED KINGDOM—*Contd.*

- Financial Review of Reviews.* January–March, 1928—Railways and industry: *E. T. Good.* Finance and the Balkans: *H. J. Fells.* The ups and downs of the Chilean nitrate industry: *G. Ashton.*
- Institute of Actuaries, Journal,* November, 1927—Casualty insurance in the United States of America: *J. G. Baker* and *G. D. Stockholm.* And illustration of adjusted differences.
- Institute of Bankers, Journal,* February, 1928—The work of the London Bankers' Clearing House during the year 1927.
- Ministry of Agriculture, Journal—*
January, 1928—Royal commission on land drainage.
February, 1928—Broadcast talk on "Better marketing": *R. J. Thompson.*
March, 1928—Address to the Argentine Rural Society: *Rt. Hon. Lord Bledisloe.* Report of the standing committee of the Council of Agriculture for England on improvement of marketing and agricultural produce.
- Public Administration, January,* 1928—Borrowing by local authorities: *I. G. Gibbon.* Local authorities under the electricity (supply) Acts: *Sir H. Haward.*
- Public Health, March,* 1928—The dental standard of the recruit: *Col. J. P. Helliwell.*
- Royal Meteorological Society, Journal, January,* 1928—The influence of forests on rainfall and run-off: *Dr. C. E. P. Brooks.*
- Secretary, February,* 1928—An index of production: *W. H. Coates.*
- Surveyors' Institution—*
January, 1928—Weather and the wheat crop, 1927: *C. T. Sanctuary.* Rating anomalies and inequalities: *J. Keith.*
February, 1928—Proposed London rating bill—memorandum by the Council.
- United Empire, March,* 1928—The Empire's tin supplies: *Rt. Hon. Lord Askwith.*

INDIA—

- Indian Journal of Economics.* October, 1927—The Hindu taxation system: *Dr. Balkrishna.* British-India and the gold standard: *E. P. Wellenstein.*

AUSTRALIA AND NEW ZEALAN

- Economic Record.* November, 1927—Australian productive efficiency: *C. H. Wickens.* The national dividend—a symposium: *L. F. Giblin, F. C. Benham,* and *J. T. Sutcliffe.* The Australian tariff and the standard of living—a re-statement: *F. C. Benham.* The mechanism of international capital transfer under the gold standard: *M. Palyi.*

UNITED STATES—

American Academy of Political and Social Science. January, 1928—A series of articles on great inland water-way projects in the United States.

American Statistical Association, Journal, December, 1927—The "total value criterion." A new principle in index-number construction: *Irving Fisher*. Forecasting the volume and value of the cotton crop: *B. B. Smith*. On a limitation in the applicability of the contingency coefficient: *J. A. Harris* and *A. E. Treloar*. Bar charts versus circle diagrams: *F. E. Croxton* and *R. E. Stryker*. The validity of correlation in time sequences and a new coefficient of similarity: *C. Gressens* and *E. D. Mouzon, jr.* Adjustments for the influence of Easter in department store sales: *A. Joy* and *W. Thomas*. The determination of the mean deviation for graded data: *M. H. Hogg*. Forecasting a line by itself: *H. D. Comer* and *R. J. Watkins*.

Harvard Business Review. January, 1928—America's agricultural position and policy: *J. S. Davis*. A balance sheet of American business: *J. G. Frederick*. Rationalization: the basis of economic *rapprochement*: *W. Donovan* and *B. M. Webster*. The unknown quantity in marketing: *A. T. Poffenberger*.

Journal of Land and Public Utility Economics. February, 1928—Some economic aspects of public utility holding company financial statements: consolidated balance sheets: *P. L. Morrison*. The recent recession of farm population and farm land: *J. Perlman*.

Journal of Political Economy—

December, 1927—The impasse in economic theory: *P. T. Homan*. Individual cycles in stock prices: *F. B. Ashby*.

February, 1928—Education for business in Great Britain: *J. G. Smith*. Recent developments of the general sales tax: *A. G. Buehler*.

Monthly Labor Review—

November, 1927—Problem of the unskilled laborer with a large family. Accident experience of various industries in 1925 and 1926. Construction cost of dwellings in various cities.

December, 1927—Explanation of the new index of wholesale prices: *E. Stewart*. Reduction of costs of production through reduction or elimination of accidents: *W. W. Nichols*.

January, 1928—Public-service retirement systems—Great Britain and France. Industrial accidents: *E. Stewart*.

Quarterly Journal of Economics. February, 1928—Supply curves and maximum satisfaction: *R. S. Meriam*. Statistical analysis and the "laws" of price: *M. Ezekiel*. The German unemployment insurance Act of 1927: *F. Wunderlich*.

ARGENTINA—

Universidad de Buenos Aires : Revista de Ciencias Económicas—

*October, 1927—*El problema de la distribución : *L. R. Gondra.*

Repercusión de la situación europea en la economía de los países ibero-americanos : *L. Olariaga.*

*November, 1927—*La importación de trigos en Italia : *C. Brebbia.*

*December, 1927—*El problema de la distribución : *L. R. Gondra.*

La velocidad de los depósitos bancarios : *W. R. Burguess.*

——— *Investigaciones de seminario.* Tomo v. 1927—La tasa del descuento y el mercado monetario : *F. Serra.* Clasificación de los gastos públicos. Estudio técnico del presupuesto : *E. J. Ferrarazzo.*

DENMARK—

Nationaløkonomisk Tidsskrift. Part 1, 1928—Bankinspektionen i Sverige : *E. Sommarin.* Arbejdseffektivitet og Arbejdsløn : *J. Pedersen.*

EGYPT—

*L'Égypte Contemporaine, January, 1928—*Les lois économiques et la guerre mondiale : *C. Colson.* L'organisation du crédit en Russie : *G. Meyer.*

FRANCE—

*Bulletin de Statistique et de Législation Comparée, November, 1927—*Les fabriques de sucre et leurs procédés de fabrication (campagne 1926-27).

Journal de la Société de Statistique de Paris—

*January, 1928—*Les résultats électoraux probables du suffrage familial en période normale : *J. Bourdon.*

*February, 1928—*Valeurs relatives des capitaux fixes et des capitaux circulants : *Yves-Guyot.* La prévision statistique des mouvements des valeurs de Bourse : *J. Dessiriers.* Les risques de faillite par profession : *M. Henry.*

Journal des Économistes—

*January, 1928—*Les équilibres budgétaires de 1927 et de 1928 : *Yves-Guyot.* Les compensations en France en 1927 : *Chambre des compensations.* Les logements à Paris, l'hygiène et le prix de revient : *A. Z.* Rapport entre nos importations de matières premières et nos exportations de produits fabriqués : *R. Pupin.*

*February, 1928—*Observations sur le discours de M. Poincaré : *Yves-Guyot.* Franc-papier ou Belga : *L. Hayois.* La Banque de France en 1928 : *X.* Les chemins de fer et la production agricole : *G. de Nouvion.*

Revue d'Économie Politique—

*November-December, 1927—*Les index économiques : *R. Roy.* La vie économique aux États-Unis : *P. M.*

FRANCE—*Contd.*

January-February, 1928—La loi du 7 août et son rôle dans l'assainissement financier de la France. La stabilisation de la monnaie en Pologne: *R. Plevén*. L'état actuel de l'économie et de la statistique agricole en Russie: *A. Tchayanoff*. La vie financière en Angleterre: *H. Pouyanne*. L'Institut für Konjunkturforschung de Berlin: *R. Claoué*.

GERMANY—

Versicherungs-Wissenschaft, Zeitschrift, January, 1928—Amerikanische Versicherung: *Prof. Manes*. Die Unfall-Zusatzversicherung in der Lebensversicherung: *Dr. Heinrich Braun*. Der finanzielle Stand der deutschen Sozialversicherung vor und nach dem Weltkrieg: *Dr. W. Dobbernack*.

Weltwirtschaftliches Archiv, January, 1928—Wissenschaft und Wirklichkeit. Betrachtungen zur Methode einer realistischen Nationalökonomie: von *Dr. A. Hesse*. Das Problem der äusseren Handelspolitik bei Friedrich List und Karl Marx: von *Dr. A. Meusel*. Funktionen des Export und des Importhandels: *Dr. E. Rosenbaum*.

HUNGARY—

Revue de la Société Hongroise de Statistique, December, 1927—Organisation de la statistique agricole de Hongrie: *E. Sajóhelyi*.

ITALY—

Giornale degli Economisti e Rivista di Statistica—

January, 1928—Considerazioni sui "barometri" economici: *C. Bresciani-Turroni*. Intorno alla teoria del profitto: *G. Sensini*.

February, 1928—Per riempire alcune "empty boxes" finanziarie: *A. Cabiati*. Alcune considerazioni sulla teoria matematica dell'equilibrio economico: *A. Bordin*. Il caso, la congiuntura ed il rischio nell'evoluzione economica: *F. Chessa*.

Giornale di Matematica Finanziaria, December, 1927—Sui sottogruppi delle tavole di sopravvivenza: *R. Taucer*. Sulla teoria degli ammortamenti (continuazione e fine): *E. Del Vecchio*.

La Riforma Sociale, January-February, 1928—Postumi d'inflazione: *G. Prato*. Caratteristiche dell'esportazione dei capitali in regime di valuta sana: *A. Cabiati*.

JAPAN—

Kyoto University Economic Review, December, 1927—Prices and injustice in taxation: *Prof. M. Kambe*. A study in financial statistics: *S. Shiomi*.

SWEDEN—

Ekonomisk Tidskrift—

Häft 10-11, 1927—Europas penningpolitik : *D. Davidson.*

Häft 12, 1927—Studier i centralbankspolitik : *D. Davidson.*

Häft 1, 1928—Principer vid kreditgivning och bankernas räntemarginal : *E. Hagerblad.* Några siffror till belysande av de svenska industribolagens skattebelastning 1912 och 1924 : *F. Lindahl.*

SWITZERLAND—

Journal de Statistique et Revue Économique Suisse—

Fasc. 4, 1927—De la valeur des réponses individuelles dans une enquête populaire : *Dr. M. Ney.* Organisation du dépouillement des relevés statistiques à faible nombre d'unités et l'emploi des machines : *Dr. P. Thorin.*

Fasc. 5, 1927—Ueber einige neuere Begriffe aus der Wirtschaftslehre des Landbaues : von *Prof. Dr. E. Laur.* De l'optimum de population : von *Dr. W. E. Rappard.* Freihandel und Schutzzölle in ihren Sozialen Wirkungen : von *Dr. Luise Sommer.*

INTERNATIONAL—

International Labour Review—

January, 1928—The control of industrial combinations from the social standpoint : *R. Hoffherr.*

February, 1928—The European coal crisis, 1926-27 : *M. Eastman.* Some aspects of recent wage movements and tendencies in various countries : *J. H. Richardson.* The Moscow institute for economic research and its work.

March, 1928—The regulation of minimum wages as an international problem : *Dr. K. Pribram.* The prevention of accidents in industrial undertakings : *Dr. F. Ritzmann.* Seasonal fluctuations in employment.

Metron. Vol. VII, No. 1, 1927. La mortalité causée par la guerre mondiale : *L. Hersch.* Some properties of correlation and regression in a limited universe : *R. C. Geary.*

LIST OF ADDITIONS TO THE LIBRARY.

Since the issue of Part I, 1928, the Society has received the publications enumerated below:—

1.—OFFICIAL PUBLICATIONS.

(a) United Kingdom and its several Divisions.

United Kingdom—

Air Ministry. Meteorological Office. Regression equations with many varieties. By *C. E. P. Brooks*. 5 pp. London: H.M. Stationery Office, 1927. 3*d.* (The Ministry.)

Overseas Trade, Department of. Reports on conditions in Cuba, 1927; Mexico, 1927; Uruguay, 1927; Venezuela, 1927. (The Department.)

Trade, Board of. Third Census of Production, 1924. Preliminary Reports, Northern Ireland, Nos. 1, 2, 3, and 4 (covering Linen, Bleaching, Dyeing, Printing, and Finishing, Clothing and Millinery, Laundry, Cleaning and Dyeing, Grain Milling, Bread, Biscuit, and Sugar Confectionery, Creameries and Bacon Curing, Brewing, Spirit Distilling, Aerated Waters and Tobacco, Metal, Shipbuilding, Engineering, Building and Contracting, Gas Works Undertakings, Timber, Mines and Quarries, etc., trades). London, 1928. (The Board.)

England and Wales—

Health, Ministry of. Reports on Public Health and Medical Subjects—
No. 45. Co-ordination of the public health services in Essex, Hampshire, Gloucester and West Sussex. By *J. Pearse*. 19 pp. 1928. 6*d.* (The Ministry.)

No. 46. Report on cancer of the rectum. vi + 70 pp. 1927. 1*s.* 6*d.* (*Id.*)

No. 47. Treatment of cancer of the uterus at the Samaritan Free Hospital. By *J. E. Lane-Claydon* and *W. McK. H. McCullagh*. iv + 36 pp. 1927. 9*d.* (*Id.*)

No. 48. The protection of motherhood. By *Dame J. M. Campbell*. vi + 87 pp. 1927. 9*d.* (*Id.*)

Circular 826, Series No. 6. Cancer. 10 pp. 1927. (*Id.*)

Industrial Fatigue Research Board—

Report No. 42. Physiological investigation of the radiant heating in various buildings. By *H. M.* and *M. D. Vernon*. iii + 61 pp. 1928. 2*s.* (The Board.)

No. 47. Two studies on hours of work.—I. Five-hour spells for women, with reference to rest-pauses. By *H. M.* and *M. D. Vernon*. II. The two-shift system in certain factories. By *M. Smith* and *M. D. Vernon*. iii + 35 pp. 1*s.* 3*d.* (*Id.*)

Medical Research Council and Department of Scientific and Industrial Research. Joint Report. The effect of different systems of lighting in output and accuracy in fine work (type-setting by hand). iv + 12 pp. 1928. 4*d.* (The Stationery Office.)

Registrar-General. Decennial Supplement, 1921. Part II. Occupational mortality, fertility, and infant mortality. cxxxix + 138 pp. 7*s.* 6*d.* (General Register Office.)

Northern Ireland—

Census, 1926: Belfast County Borough. xxvii + 27 fol. pp. Belfast. 1928. 5*s.* (Registrar-General.)

(b) India, Dominions and Protectorates.

India—

Bombay and Alibag Government Observatories. Magnetical, Meteorological and Seismographic observations. 1922. 28 pp. Calcutta, 1926. 11s. 9d.

Bombay. Labour Office—

Report of an enquiry into deductions from wages or payments in respect of fines. xiv + 94 pp. Bombay. 1928. 2s. 6d. (Labour Office.)

Report on the enquiry into middle-class family budgets in Bombay city. 33 + viii pp. Bombay, 1928. 1s. 9d. (*Id.*)

Irish Free State—

Industry and Commerce, Department of. Agricultural statistics, 1847–1926. Report and tables. lxx + 162 pp. Dublin: Stationery Office, 1928. 2s. 3d. (Stationery Office.)

Union of South Africa—

Fourth Census. May 1926. Part II. Population. Ages of the European Population. ix + 80 pp. Pretoria. Govt. Printing and Stationery Office, 1927. (Office of Census.)

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France—

Résultats statistiques du recensement général de la population, 1921. État civil de la population active. Tome I. Partie IV. 136 pp. Paris, 1927. (Statistique Générale de la France.)

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Memorandum on production and trade, 1913 and 1923-26. 73 pp. 1928. 2s.

Official declarations concerning the recommendations of the International Economic Conference held May 1927. 53 pp. 1928. 1s. 6d. (*Id.*)

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Exports: Declared value of U.K. Produce and Manufactures, and of Imported Merchandise, exported from the United Kingdom in the years ended December 31, 1925, 1926 and 1927.

| Countries to which consigned. | 1925. | | 1926. | | 1927. | |
|--|----------------|----------------|----------------|----------------|----------------|----------------|
| | Exports. | Re-exports. | Exports. | Re-exports. | Exports. | Re-exports. |
| | £'000 | £'000 | £'000 | £'000 | £'000 | £'000 |
| Russia | 6,240 | 13,017 | 5,858 | 8,543 | 4,513 | 6,782 |
| Finland | 3,999 | 699 | 2,771 | 768 | 3,234 | 545 |
| Sweden | 11,576 | 1,739 | 8,052 | 1,289 | 9,654 | 1,029 |
| Norway | 8,113 | 789 | 6,916 | 567 | 7,456 | 504 |
| Denmark,* with Faroe Islands | 10,954 | 1,227 | 8,714 | 884 | 9,780 | 788 |
| Poland, including Dantzic ... | 3,712 | 888 | 2,471 | 912 | 5,312 | 849 |
| Germany | 44,226 | 27,263 | 26,352 | 20,922 | 41,825 | 27,590 |
| Netherlands* | 24,509 | 6,875 | 17,934 | 4,628 | 21,220 | 4,825 |
| Java | 8,411 | 91 | 5,728 | 85 | 6,059 | 95 |
| Belgium* | 18,667 | 10,264 | 14,266 | 8,100 | 16,468 | 8,790 |
| France | 31,026 | 23,217 | 20,384 | 20,224 | 23,636 | 18,457 |
| Switzerland | 9,212 | 1,182 | 6,194 | 1,637 | 7,645 | 1,372 |
| Portugal* | 4,170 | 633 | 3,364 | 589 | 3,890 | 431 |
| Spain* | 10,278 | 759 | 7,220 | 539 | 10,217 | 631 |
| Italy,* including Fiume | 18,835 | 2,869 | 10,500 | 1,960 | 13,486 | 2,240 |
| Czechoslovakia | 1,557 | 231 | 1,330 | 178 | 1,836 | 204 |
| Greece | 6,014 | 157 | 3,377 | 127 | 4,736 | 162 |
| Romania | 3,073 | 115 | 2,612 | 86 | 2,682 | 107 |
| Turkey, European and Asiatic, incl. Smyrna and Armenia... | 4,600 | 210 | 3,103 | 108 | 3,181 | 104 |
| Egypt | 16,424 | 257 | 11,030 | 228 | 12,568 | 195 |
| China† | 14,633 | 175 | 16,409 | 242 | 9,691 | 120 |
| Japan† | 16,237 | 263 | 13,904 | 276 | 15,161 | 232 |
| United States | 52,074 | 31,131 | 49,116 | 25,835 | 45,482 | 21,458 |
| Cuba | 2,605 | 81 | 2,073 | 109 | 2,099 | 76 |
| Mexico | 3,136 | 58 | 2,772 | 54 | 2,201 | 34 |
| Peru | 2,381 | 74 | 2,349 | 81 | 2,088 | 74 |
| Chile | 6,029 | 308 | 5,666 | 279 | 5,183 | 228 |
| Brazil | 16,155 | 331 | 12,610 | 280 | 14,391 | 277 |
| Uruguay | 3,179 | 71 | 2,377 | 62 | 2,866 | 56 |
| Argentine Republic..... | 29,145 | 590 | 23,074 | 575 | 26,993 | 610 |
| Other countries | 46,796 | 2,173 | 37,669 | 1,645 | 46,901 | 2,150 |
| <i>Total—Foreign Countries ...</i> | <i>438,266</i> | <i>127,737</i> | <i>336,195</i> | <i>101,812</i> | <i>382,454</i> | <i>101,015</i> |
| BRITISH POSSESSIONS. | | | | | | |
| Irish Free State | 40,217 | 10,963 | 34,758 | 10,417 | 36,144 | 9,366 |
| British West Africa | 13,920 | 1,383 | 11,733 | 1,360 | 14,690 | 1,450 |
| Union of South Africa | 30,748 | 1,651 | 32,164 | 1,640 | 30,516 | 1,533 |
| British East Africa | 5,154 | 168 | 4,483 | 159 | 4,651 | 125 |
| British India, with Burmah ... | 86,048 | 1,187 | 81,755 | 1,402 | 85,058 | 1,291 |
| Straits Settlements and Federated Malay States ... | 13,534 | 326 | 14,044 | 451 | 14,681 | 422 |
| Ceylon and Dependencies | 5,039 | 155 | 5,692 | 211 | 5,876 | 234 |
| Australia | 60,169 | 3,855 | 61,331 | 2,430 | 61,189 | 2,566 |
| New Zealand | 23,073 | 1,111 | 20,583 | 784 | 19,607 | 792 |
| Canada | 27,553 | 3,131 | 26,374 | 2,367 | 29,259 | 2,111 |
| Brit. W. Indies, with Bahamas | 4,501 | 310 | 4,022 | 302 | 4,528 | 253 |
| Other Possessions | 25,158 | 2,059 | 19,912 | 2,160 | 20,452 | 1,904 |
| <i>Total—British Possessions</i> | <i>335,114</i> | <i>26,299</i> | <i>316,851</i> | <i>23,683</i> | <i>326,651</i> | <i>22,047</i> |
| Total — Foreign Countries and British Possessions ... | 773,380 | 154,036 | 653,046 | 125,495 | 709,105 | 123,062 |

* Excluding colonies.

† Excluding Hong Kong, Macao, and leased territories.

‡ Including Formosa and leased territories; excluding Korea.

Imports.—Declared value of merchandise imported into the United Kingdom in the years ended December 31, 1925, 1926, 1927.

| Countries from which consigned. | 1925. | 1926. | 1927. |
|---|-----------|-----------|-----------|
| | £'000. | £'000. | £'000. |
| Russia | 25,322 | 24,130 | 21,057 |
| Finland | 13,214 | 13,288 | 15,902 |
| Sweden | 21,327 | 21,426 | 25,264 |
| Norway | 12,978 | 12,163 | 12,920 |
| Denmark, including Faroe Islands | 49,054 | 47,954 | 49,977 |
| Poland, including Dantzic | 5,165 | 8,526 | 8,100 |
| Germany | 48,403 | 72,610 | 59,825 |
| Netherlands | 45,598 | 50,299 | 44,483 |
| Java | 9,382 | 9,951 | 10,114 |
| Belgium | 35,557 | 44,853 | 46,489 |
| France | 65,042 | 59,177 | 63,477 |
| Switzerland | 18,966 | 13,693 | 14,412 |
| Portugal | 4,767 | 4,499 | 4,719 |
| Spain | 19,887 | 17,047 | 18,879 |
| Italy | 19,289 | 15,734 | 16,772 |
| Czechoslovakia | 10,722 | 10,916 | 9,361 |
| Greece | 2,947 | 2,481 | 2,978 |
| Roumania | 2,284 | 2,673 | 2,376 |
| Turkey, European and Asiatic, including Smyrna and Armenia | 2,424 | 3,004 | 3,004 |
| Egypt | 34,202 | 25,101 | 23,685 |
| China | 13,448 | 11,539 | 12,223 |
| Japan | 7,281 | 7,204 | 8,166 |
| United States | 245,278 | 228,891 | 200,353 |
| Cuba | 11,629 | 4,499 | 6,607 |
| Mexico | 5,315 | 6,044 | 5,523 |
| Peru | 8,583 | 7,214 | 8,216 |
| Chili | 12,357 | 7,769 | 7,457 |
| Brazil | 5,993 | 4,251 | 4,466 |
| Uruguay | 4,899 | 4,545 | 4,567 |
| Argentine Republic | 68,856 | 67,505 | 76,584 |
| Other countries | 61,410 | 56,219 | 64,374 |
| <i>Total—Foreign Countries</i> | 891,579 | 865,205 | 852,330 |
| BRITISH POSSESSIONS.* | | | |
| Irish Free State | 43,382 | 40,866 | 43,272 |
| British West Africa | 13,771 | 12,549 | 11,527 |
| Union of South Africa | 25,123 | 18,908 | 21,418 |
| British East Africa | 7,822 | 5,865 | 5,890 |
| British India, with Burma | 80,099 | 57,638 | 65,913 |
| Straits Settlements and Federated Malay States | 23,441 | 26,230 | 21,617 |
| Ceylon and Dependencies | 17,040 | 17,931 | 16,670 |
| Australia | 72,637 | 61,030 | 52,809 |
| New Zealand | 51,331 | 46,813 | 46,518 |
| Canada | 70,586 | 64,048 | 55,137 |
| British W. Indies, with Bahamas | 5,941 | 4,822 | 4,514 |
| Other Possessions | 17,963 | 19,456 | 21,772 |
| <i>Total—British Possessions</i> | 429,136 | 376,156 | 367,057 |
| Total—Foreign Countries and British Possessions | 1,320,715 | 1,241,361 | 1,219,387 |

* Including Protectorates and Mandated Territories.

PERIODICAL RETURNS.

REGISTRATION OF THE UNITED KINGDOM.

No. I.—ENGLAND AND WALES.

BIRTHS, DEATHS AND MARRIAGES—To 31st DECEMBER, 1927.

A.—*Serial Table of BIRTHS, DEATHS and MARRIAGES, returned in the Years 1927-1921, and in the QUARTERS of those Years.**Calendar YEARS, 1927-1921 :—Numbers.*

| Years | 1927.* | '26. | '25. | '24. | '23. | '22. | '21. |
|----------------|---------|---------|---------|---------|---------|---------|---------|
| Births.....No. | 654,969 | 694,563 | 710,582 | 729,933 | 758,131 | 780,124 | 848,814 |
| Deaths ... , | 484,636 | 453,804 | 472,841 | 473,235 | 444,785 | 486,780 | 458,629 |
| Marriages , | 307,818 | 279,860 | 295,689 | 296,416 | 292,408 | 299,524 | 320,852 |

QUARTERS of each Calendar Year, 1927-1921.

(I.) BIRTHS :—Numbers.

| <i>Qrs. ended last day of</i> | 1927.* | '26. | '25. | '24. | '23. | '22. | '21. |
|-------------------------------|---------|---------|---------|---------|---------|---------|---------|
| March.....No. | 167,126 | 173,997 | 175,523 | 185,389 | 192,892 | 207,539 | 209,579 |
| June , | 171,080 | 181,332 | 186,864 | 187,038 | 196,754 | 200,524 | 225,301 |
| September , | 164,009 | 174,837 | 181,835 | 186,579 | 190,062 | 195,718 | 214,806 |
| December , | 152,754 | 164,397 | 166,360 | 170,927 | 178,423 | 176,343 | 199,128 |

(II.) DEATHS :—Numbers.

| <i>Qrs. ended last day of</i> | 1927.* | '26. | '25. | '24. | '23. | '22. | '21. |
|-------------------------------|---------|---------|---------|---------|---------|---------|---------|
| March.....No. | 168,770 | 130,611 | 138,299 | 160,274 | 124,711 | 165,493 | 129,273 |
| June , | 107,608 | 113,809 | 113,218 | 114,188 | 114,044 | 120,302 | 108,469 |
| September , | 92,263 | 90,705 | 95,054 | 90,138 | 91,250 | 90,927 | 99,096 |
| December , | 115,995 | 118,679 | 126,270 | 108,635 | 114,780 | 110,058 | 121,791 |

(III.) MARRIAGES :—Numbers.

| <i>Qrs. ended last day of</i> | 1927.* | '26. | '25. | '24. | '23. | '22. | '21. |
|-------------------------------|--------|--------|--------|--------|--------|--------|--------|
| MarchNo. | 47,855 | 46,228 | 46,263 | 47,068 | 53,316 | 50,382 | 76,158 |
| June , | 84,891 | 78,393 | 81,921 | 81,301 | 74,929 | 82,817 | 71,328 |
| September , | 91,739 | 83,830 | 90,314 | 89,841 | 87,289 | 89,730 | 89,477 |
| December , | 83,333 | 71,409 | 77,191 | 78,206 | 76,874 | 76,595 | 83,889 |

* Provisional.

Annual Rates of BIRTHS, DEATHS and PERSONS MARRIED, per 1,000 PERSONS
LIVING in the Years 1927-1920, and in the QUARTERS of those Years.

Calendar YEARS, 1927-1920:—General Ratios.

| YEARS. | 1927.† | '26. | '25. | '24. | '23. | '22. | '21. | '20. |
|--|---------|---------|---------|---------|---------|---------|---------|----------|
| Estd. Popln. of England and Wales in thousands in middle of each Year | 39,290, | 39,067, | 38,890, | 38,746, | 38,403, | 38,158, | 37,887, | 37,247,* |
| Births | 16.7 | 17.8 | 18.3 | 18.8 | 19.7 | 20.4 | 22.4 | 25.5 |
| Deaths | 12.3 | 11.6 | 12.2 | 12.2 | 11.6 | 12.8 | 12.1 | 12.4 |
| Persons Mar- ried | 15.7 | 14.3 | 15.2 | 15.3 | 15.2 | 15.7 | 16.9 | 20.2 |

QUARTERS of each Calendar Year, 1927-1920.

(I.) BIRTHS:—Ratio per 1,000.

| Qrs. ended last day of | 1927.† | '26. | '25. | '24. | '23. | '22. | '21. | '20. |
|---------------------------|--------|------|------|------|------|------|------|------|
| March | 17.3 | 18.1 | 18.3 | 19.2 | 20.4 | 22.1 | 22.4 | 29.2 |
| June | 17.5 | 18.6 | 19.3 | 19.4 | 20.5 | 21.1 | 23.9 | 26.5 |
| September ... | 16.6 | 17.8 | 18.6 | 19.1 | 19.6 | 20.3 | 22.5 | 24.2 |
| December ... | 15.4 | 16.7 | 17.0 | 17.5 | 18.4 | 18.3 | 20.9 | 22.0 |

(II.) DEATHS:—Ratio per 1,000.

| Qrs. ended last day of | 1927.† | '26. | '25. | '24. | '23. | '22. | '21. | '20. |
|---------------------------|--------|------|------|------|------|------|------|-------|
| March | 17.4 | 13.6 | 14.4 | 16.6 | 13.2 | 17.6 | 13.8 | 14.7* |
| June | 11.0 | 11.7 | 11.7 | 11.8 | 11.9 | 12.6 | 11.5 | 12.8* |
| September ... | 9.3 | 9.2 | 9.7 | 9.2 | 9.4 | 9.5 | 10.4 | 10.0* |
| December ... | 11.7 | 12.1 | 12.9 | 11.1 | 11.9 | 11.4 | 12.8 | 12.3* |

(III.) PERSONS MARRIED:—Ratio per 1,000.

| Qrs. ended last day of | 1927.† | '26. | '25. | '24. | '23. | '22. | '21. | '20. |
|---------------------------|--------|------|------|------|------|------|------|------|
| March | 9.9 | 9.6 | 9.6 | 9.7 | 11.3 | 10.7 | 16.3 | 14.9 |
| June | 17.3 | 16.1 | 16.9 | 16.8 | 15.7 | 17.4 | 15.1 | 23.2 |
| September ... | 18.5 | 17.0 | 18.4 | 18.4 | 18.0 | 18.7 | 18.7 | 23.2 |
| December .. | 16.8 | 14.4 | 15.7 | 16.0 | 15.9 | 15.9 | 17.6 | 19.4 |

* Civilians only.

† Provisional figures.

B.—Special Town Table :—POPULATION; BIRTH-RATE and DEATH-RATE (Civilians) in each Quarter of 1927, in certain of the 107 County Boroughs and Great Towns.

| Cities and boroughs. | Estimated population mid 1926. | Annual Rate to 1,000 Living during the thirteen weeks ending | | | | | | | |
|---------------------------------|--------------------------------|--|---------|---------------------------------|---------|---------------------------------|---------|----------------------------------|---------|
| | | April 2, 1927. (1st quarter.) | | July 2, 1927. (2nd quarter.) | | Oct. 1, 1927. (3rd quarter.) | | Dec. 31, 1927. (4th quarter.) | |
| | | Births. | Deaths. | Births. | Deaths. | Births. | Deaths. | Births. | Deaths. |
| * 107 county boroughs and towns | 19,411,253 | 18.0 | 17.4 | 18.2 | 10.7 | 17.2 | 9.2 | 16.1 | 11.9 |
| Including— | | | | | | | | | |
| London | 4,605,400* | 17.2 | 16.8 | 17.4 | 10.0 | 16.4 | 8.7 | 15.2 | 11.7 |
| West Ham C.B. | 315,900 | 22.4 | 15.3 | 22.4 | 9.9 | 20.6 | 7.5 | 20.0 | 10.8 |
| Croydon C.B. | 205,900 | 17.1 | 16.7 | 15.9 | 10.2 | 17.1 | 8.3 | 14.7 | 11.4 |
| Brighton C.B. | 139,500* | 15.3 | 19.6 | 15.4 | 10.9 | 14.0 | 9.6 | 13.3 | 12.4 |
| Portsmouth C.B. | 231,500* | 17.7 | 16.7 | 18.8 | 11.2 | 17.1 | 10.0 | 17.1 | 12.0 |
| Bristol C.B. | 383,300* | 18.0 | 18.1 | 18.0 | 9.5 | 17.0 | 9.3 | 15.6 | 12.5 |
| Cardiff C.B. | 225,600* | 18.7 | 18.4 | 20.8 | 11.1 | 18.1 | 8.8 | 17.6 | 11.1 |
| Swansea C.B. | 163,200 | 19.2 | 17.2 | 18.4 | 11.1 | 17.5 | 9.1 | 17.8 | 10.9 |
| Wolverhampton C.B. | 110,000 | 19.3 | 19.5 | 21.6 | 9.9 | 18.7 | 8.4 | 19.7 | 10.9 |
| Birmingham C.B. | 934,300* | 19.8 | 16.3 | 20.4 | 10.8 | 19.2 | 8.8 | 17.4 | 11.4 |
| Norwich C.B. | 123,500* | 17.9 | 18.1 | 20.3 | 10.4 | 18.3 | 9.3 | 16.1 | 10.7 |
| Leicester C.B. | 241,700 | 18.1 | 17.1 | 17.8 | 10.8 | 16.8 | 9.5 | 15.5 | 12.3 |
| Nottingham C.B. | 268,000 | 18.6 | 21.1 | 17.5 | 11.3 | 17.5 | 10.0 | 16.0 | 12.7 |
| Derby C.B. | 136,600* | 18.4 | 18.8 | 19.1 | 9.7 | 18.4 | 8.4 | 16.0 | 12.1 |
| Birkenhead C.B. | 158,000 | 18.3 | 16.4 | 19.9 | 10.8 | 18.8 | 9.0 | 17.4 | 11.5 |
| Liverpool C.B. | 862,600 | 22.8 | 18.7 | 22.8 | 12.2 | 22.2 | 10.1 | 21.2 | 13.1 |
| Bolton C.B. | 177,000 | 17.0 | 19.9 | 14.2 | 11.9 | 15.7 | 10.5 | 13.2 | 12.3 |
| Manchester C.B. | 752,000 | 19.1 | 19.4 | 19.0 | 11.9 | 18.1 | 9.7 | 16.9 | 13.7 |
| Salford C.B. | 247,400 | 17.6 | 18.4 | 17.8 | 10.7 | 16.5 | 10.3 | 15.1 | 12.4 |
| Oldham C.B. | 143,000 | 14.2 | 17.7 | 15.3 | 13.6 | 15.3 | 10.4 | 13.7 | 14.1 |
| Burnley C.B. | 99,600 | 15.5 | 22.6 | 16.1 | 12.8 | 15.5 | 11.1 | 13.2 | 13.8 |
| Blackburn C.B. | 124,400 | 15.3 | 23.9 | 14.4 | 12.2 | 14.3 | 10.1 | 12.8 | 12.8 |
| Preston C.B. | 124,200 | 15.4 | 21.7 | 15.7 | 12.5 | 14.0 | 9.6 | 12.9 | 12.7 |
| Huddersfield C.B. | 111,900 | 14.5 | 20.0 | 17.5 | 13.8 | 12.3 | 11.3 | 13.3 | 13.1 |
| Halifax C.B. | 96,130* | 16.5 | 23.3 | 15.0 | 13.8 | 17.2 | 12.2 | 13.3 | 15.3 |
| Bradford C.B. | 288,700 | 15.4 | 20.1 | 15.6 | 13.3 | 15.0 | 10.5 | 13.9 | 13.9 |
| Leeds C.B. | 473,400 | 17.8 | 17.2 | 18.0 | 11.9 | 16.3 | 9.8 | 16.2 | 12.2 |
| Sheffield C.B. | 523,300* | 18.2 | 17.4 | 16.6 | 10.4 | 16.1 | 9.1 | 15.6 | 11.6 |
| Hull C.B. | 294,600 | 20.4 | 19.1 | 20.6 | 11.8 | 18.4 | 9.7 | 18.1 | 12.4 |
| Sunderland C.B. | 163,800 | 23.6 | 17.5 | 23.8 | 13.2 | 20.4 | 10.6 | 22.8 | 13.0 |
| Gateshead C.B. | 127,700 | 21.2 | 13.9 | 22.1 | 12.9 | 18.2 | 11.3 | 17.7 | 13.0 |
| Newcastle-on-Tyne C.B. | 284,700* | 22.1 | 15.5 | 22.7 | 11.2 | 22.1 | 9.6 | 20.5 | 12.9 |

* Excluding non-civilians.

Note.—The 107 great towns are those with populations exceeding 50,000 persons at the Census of 1921; before the second quarter of 1927 the figures referred to 105 towns only.

No. II.—SCOTLAND.

BIRTHS, DEATHS AND MARRIAGES, IN THE YEAR ENDED
DECEMBER 31, 1927.

I.—Serial Table :—Number of BIRTHS, DEATHS and MARRIAGES in Scotland, and their Proportion to the Population estimated to the Middle of each Year, during each Quarter of the Years 1927–1923 inclusive.

| | 1927. | | 1926. | | 1925. | | 1924. | | 1923. | |
|---------------------|-----------|------------|-----------|------------|-----------|------------|-----------|------------|-----------|------------|
| | Number. | Per 1,000. | Number. | Per 1,000. | Number. | Per 1,000. | Number. | Per 1,000. | Number. | Per 1,000. |
| <i>1st Quarter—</i> | | | | | | | | | | |
| Births | 24,775 | 20.5 | 26,170 | 21.6 | 25,232 | 20.9 | 27,452 | 22.7 | 28,530 | 23.6 |
| Deaths ... | 19,447 | 16.1 | 17,928 | 14.8 | 18,349 | 15.2 | 21,967 | 18.1 | 17,671 | 14.6 |
| Marriages | 7,357 | 6.1 | 7,825 | 6.5 | 7,647 | 6.3 | 7,302 | 6.0 | 8,083 | 6.7 |
| <i>2nd Quarter—</i> | | | | | | | | | | |
| Births | 25,116 | 20.6 | 26,996 | 22.1 | 27,909 | 22.9 | 27,985 | 23.1 | 29,140 | 23.8 |
| Deaths ... | 15,803 | 13.0 | 17,008 | 13.9 | 15,911 | 13.0 | 17,872 | 14.8 | 16,321 | 13.4 |
| Marriages | 7,941 | 6.5 | 7,685 | 6.3 | 8,017 | 6.6 | 7,977 | 6.6 | 8,881 | 7.3 |
| <i>3rd Quarter—</i> | | | | | | | | | | |
| Births | 23,496 | 19.1 | 24,821 | 20.1 | 25,593 | 20.8 | 26,175 | 21.4 | 27,087 | 21.9 |
| Deaths ... | 13,641 | 11.1 | 12,866 | 10.4 | 13,449 | 10.9 | 13,703 | 11.2 | 13,172 | 10.7 |
| Marriages | 9,102 | 7.4 | 8,408 | 6.8 | 9,140 | 7.4 | 9,147 | 7.5 | 9,872 | 8.0 |
| <i>4th Quarter—</i> | | | | | | | | | | |
| Births | 23,282 | 18.9 | 24,462 | 19.8 | 25,403 | 20.6 | 25,288 | 20.7 | 27,145 | 22.0 |
| Deaths ... | 16,939 | 13.7 | 15,978 | 12.9 | 17,796 | 14.4 | 16,815 | 13.7 | 16,119 | 13.0 |
| Marriages | 8,189 | 6.6 | 7,335 | 5.9 | 7,664 | 6.2 | 7,926 | 6.5 | 8,364 | 6.8 |
| <i>Year—</i> | | | | | | | | | | |
| Population | 4,894,700 | | 4,903,300 | | 4,891,300 | | 4,881,637 | | 4,901,100 | |
| Births | 96,669 | 19.8 | 102,449 | 20.9 | 104,137 | 21.3 | 106,900 | 21.9 | 111,902 | 22.8 |
| Deaths | 65,830 | 13.5 | 63,780 | 13.0 | 65,505 | 13.4 | 70,357 | 14.4 | 63,283 | 12.9 |
| Marriages ... | 32,589 | 6.7 | 31,253 | 6.4 | 32,468 | 6.6 | 32,352 | 6.6 | 35,200 | 7.2 |

II.—*Special Average Table:—Number of Births, Deaths and Marriages in Scotland and in the divisions of the counties during each Quarter of 1927, and their proportion to the population.*

| Registration group of districts. | Total Births. | | Deaths. | | Marriages. | |
|----------------------------------|---------------|--------------------------|---------|--------------------------|------------|--------------------------|
| | Number. | Per 1,000 of population. | Number. | Per 1,000 of population. | Number. | Per 1,000 of population. |
| <i>1st quarter—SCOTLAND</i> | 24,771 | 20.5 | 19,445 | 16.1 | 7,355 | 6.1 |
| Northern division ... | 335 | 15.6 | 403 | 18.7 | 121 | 5.6 |
| North Western div. | 630 | 17.6 | 765 | 21.4 | 165 | 4.6 |
| North Eastern div. | 2,303 | 21.5 | 2,039 | 19.0 | 594 | 5.5 |
| East Midland div. ... | 3,431 | 19.4 | 3,235 | 18.0 | 984 | 5.5 |
| West Midland div. ... | 1,895 | 18.8 | 1,407 | 14.0 | 472 | 4.7 |
| South Western div.... | 11,952 | 22.3 | 7,928 | 14.8 | 3,626 | 6.8 |
| South Eastern div. ... | 3,333 | 19.1 | 2,829 | 16.2 | 1,158 | 6.6 |
| Southern div. | 842 | 18.8 | 839 | 18.7 | 235 | 5.2 |
| <i>2nd quarter—SCOTLAND</i> | 25,119 | 20.6 | 15,801 | 12.9 | 7,941 | 6.5 |
| Northern division ... | 382 | 17.6 | 389 | 17.9 | 89 | 4.1 |
| North Western div. | 572 | 15.8 | 582 | 16.1 | 136 | 3.8 |
| North Eastern div. | 2,363 | 21.8 | 1,453 | 13.4 | 759 | 7.0 |
| East Midland div. ... | 3,321 | 18.3 | 2,296 | 12.6 | 1,058 | 5.8 |
| West Midland div. ... | 1,970 | 19.3 | 1,174 | 11.5 | 479 | 4.7 |
| South Western div.... | 12,246 | 22.6 | 7,008 | 12.9 | 3,755 | 6.9 |
| South Eastern div. ... | 3,372 | 19.1 | 2,222 | 12.6 | 1,349 | 7.7 |
| Southern div. | 893 | 19.7 | 677 | 14.9 | 316 | 7.0 |
| <i>3rd quarter—SCOTLAND</i> | 23,493 | 19.0 | 13,639 | 11.1 | 9,104 | 7.4 |
| Northern division ... | 356 | 16.2 | 300 | 13.6 | 102 | 4.6 |
| North Western div. | 581 | 15.9 | 470 | 12.9 | 159 | 4.4 |
| North Eastern div. ... | 2,196 | 20.0 | 1,264 | 11.5 | 761 | 6.9 |
| East Midland div. ... | 3,065 | 16.7 | 2,181 | 11.9 | 1,161 | 6.3 |
| West Midland div. ... | 1,753 | 17.0 | 1,007 | 9.8 | 656 | 6.4 |
| South Western div.... | 11,474 | 20.9 | 5,892 | 10.7 | 4,355 | 7.9 |
| South Eastern div. ... | 3,199 | 17.9 | 1,985 | 11.1 | 1,631 | 9.1 |
| Southern div. | 869 | 18.9 | 540 | 11.8 | 279 | 6.1 |
| <i>4th quarter—SCOTLAND</i> | 23,282 | 18.9 | 16,939 | 13.7 | 8,189 | 6.6 |
| Northern division ... | 336 | 15.3 | 338 | 15.4 | 100 | 4.5 |
| North Western div. | 584 | 16.0 | 510 | 14.0 | 185 | 5.1 |
| North Eastern div. | 2,104 | 19.2 | 1,465 | 13.4 | 852 | 7.8 |
| East Midland div. ... | 3,178 | 17.3 | 2,424 | 13.2 | 1,203 | 6.5 |
| West Midland div. ... | 1,813 | 17.6 | 1,263 | 12.3 | 515 | 5.0 |
| South Western div.... | 11,310 | 20.6 | 7,931 | 14.5 | 3,743 | 6.8 |
| South Eastern div. ... | 3,159 | 17.7 | 2,408 | 13.5 | 1,287 | 7.2 |
| Southern div. | 798 | 17.4 | 600 | 13.1 | 304 | 6.6 |

Population of Scotland.

| Population. | Scotland. | Northern division. | North Western division. | North Eastern division. | East Midland division. | West Midland division. | South Western division. | South Eastern division. | Southern division. |
|---------------------------|-----------|--------------------|-------------------------|-------------------------|------------------------|------------------------|-------------------------|-------------------------|--------------------|
| By Census of 1911 | 4,760,904 | 105,997 | 164,636 | 467,333 | 712,146 | 386,312 | 2,033,521 | 700,577 | 190,382 |
| Estimated " 1921 | 4,582,497 | 95,718 | 153,273 | 450,441 | 729,955 | 423,153 | 2,137,619 | 704,011 | 188,297 |
| Estimated to mid 1927 ... | 4,894,700 | 87,800 | 145,000 | 435,200 | 729,400 | 402,500 | 2,176,300 | 707,300 | 182,100 |

No. III.—NORTHERN IRELAND.

NORTHERN IRELAND.—Number of Births, Deaths and Marriages for each Quarter of 1927 and their Proportion to the Population.

| | Births. | | Deaths. | | Marriages. | |
|---------------------|---------|-------------------------------------|---------|--------------------------------------|------------|-------------------------------------|
| | Number. | Annual rate per 1,000 of population | Number. | Annual rate per 1,000 of population. | Number. | Annual rate per 1,000 of population |
| 1st quarter | 6,741 | 21·5 | 5,316 | 17·0 | 1,492 | 4·8 |
| 2nd „ | 7,298 | 23·3 | 4,979 | 15·9 | 1,840 | 5·9 |
| 3rd „ | 6,595 | 21·1 | 3,645 | 11·6 | 1,973 | 6·3 |
| 4th „ | 6,065 | 19·4 | 4,286 | 13·7 | 1,886 | 6·0 |
| Total for year 1927 | 26,699 | 21·3 | 18,226 | 14·5 | 7,191 | 5·7 |

Population of Northern Ireland, estimated provisionally to mid 1927 (inclusive of military) :—1,253,000.

| | Births. | | Deaths. | | Marriages | |
|-------------------------------------|---------|--------------------------------|---------|--------------------------------|-----------|--------------------------------|
| | Number. | Annual rate per 1,000 persons. | Number. | Annual rate per 1,000 persons. | Number. | Annual rate per 1,000 persons. |
| <i>1st quarter—</i> | | | | | | |
| Total rural districts | 3,005 | 19·4 | 2,617 | 16·9 | | |
| Total co. boroughs and urban dists. | 3,736 | 23·4 | 2,699 | 16·9 | | |
| Belfast C.B. ... | 2,431 | 23·4 | 1,748* | 16·9 | | |
| Londonderry C.B. | 323 | 28·8 | 196 | 17·5 | | |
| <i>2nd quarter—</i> | | | | | | |
| Total rural districts | 3,192 | 20·6 | 2,736 | 17·7 | | |
| Total co. boroughs and urban dists. | 4,106 | 25·8 | 2,243 | 14·1 | | |
| Belfast C.B. ... | 2,687 | 25·9 | 1,414* | 13·6 | | |
| Londonderry C.B. | 295 | 26·3 | 153 | 13·6 | | |
| <i>3rd quarter—</i> | | | | | | |
| Total rural districts | 3,092 | 20·0 | 1,927 | 12·5 | | |
| Total co. boroughs and urban dists. | 3,503 | 21·9 | 1,718 | 10·8 | | |
| Belfast C.B. ... | 2,294 | 22·2 | 1,132* | 10·9 | | |
| Londonderry C.B. | 272 | 24·2 | 134 | 11·9 | | |
| <i>4th quarter—</i> | | | | | | |
| Total rural districts | 2,852 | 18·5 | 2,189 | 14·2 | | |
| Total co. boroughs and urban dists. | 3,213 | 20·1 | 2,097 | 13·1 | | |
| Belfast C.B. ... | 2,097 | 20·3 | 1,359* | 13·1 | | |
| Londonderry C.B. | 228 | 20·2 | 143 | 12·7 | | |

* Including deaths of persons admitted from Belfast into institutions outside the co. borough, numbering 74, 52, 36 and 55 in the respective quarters.

No. IV.—IRISH FREE STATE.

Number of Births, Deaths and Marriages in the Irish Free State for each quarter of the year 1927, and their proportion to the population.

| | Births. | | Deaths. | | Marriages. | |
|---------------------|---------|--------------------------------------|---------|--------------------------------------|------------|--------------------------------------|
| | Number. | Annual rate per 1,000 of population. | Number. | Annual rate per 1,000 of population. | Number. | Annual rate per 1,000 of population. |
| 1st quarter ... | 14,833 | 20.1 | 13,407 | 18.1 | 3,825 | 5.2 |
| 2nd „ ... | 15,884 | 21.5 | 11,801 | 16.0 | 3,087 | 4.2 |
| 3rd „ ... | 15,232 | 20.6 | 8,680 | 11.7 | 3,463 | 4.7 |
| 4th „ ... | 14,031 | 19.0 | 9,797 | 13.2 | — | — |
| Total for year 1927 | 59,980 | 20.3 | 43,685 | 14.8 | — | — |

Population of the Free State estimated to mid 1927 :—2,958,000.

| | Births. | | Deaths. | | Marriages. | |
|------------------------------|---------|--------------------------------|---------|--------------------------------|------------|--------------------------------|
| | Number. | Annual rate per 1,000 persons. | Number. | Annual rate per 1,000 persons. | Number. | Annual rate per 1,000 persons. |
| 1st quarter, 1927— | | | | | | |
| Total rural districts | 9,751 | 18.6 | 8,699 | 16.6 | | |
| Total urban „ | 5,082 | 23.5 | 4,708 | 21.8 | | |
| Dublin registration area ... | 3,942 | 25.3 | 2,654 | 23.8 | | |
| Cork regn. area | 421 | 21.5 | 408 | 20.8 | | |
| 2nd quarter— | | | | | | |
| Total rural districts | 10,487 | 20.0 | 8,431 | 16.1 | | |
| Total urban „ | 5,397 | 25.0 | 3,370 | 15.6 | | |
| Dublin registration area ... | 2,789 | 26.5 | 1,696 | 16.1 | | |
| Cork regn. area | 448 | 22.8 | 216 | 15.1 | | |
| 3rd quarter— | | | | | | |
| Total rural districts | 9,882 | 18.9 | 6,129 | 11.7 | | |
| Total urban „ | 5,350 | 24.8 | 2,551 | 11.8 | | |
| Dublin registration area ... | 2,799 | 26.6 | 1,248 | 11.9 | | |
| Cork regn. area | 450 | 22.9 | 193 | 9.8 | | |
| 4th quarter— | | | | | | |
| Total rural districts | 9,340 | 17.8 | 6,688 | 12.8 | — | |
| Total urban „ | 4,691 | 21.7 | 3,109 | 14.4 | — | |
| Dublin registration area ... | 2,413 | 22.9 | 1,638 | 15.6 | — | |
| Cork regn. area | 380 | 19.5 | 253 | 13.0 | — | |

Details not available.

No. V.—GREAT BRITAIN AND IRELAND.

SUMMARY OF BIRTHS, DEATHS and MARRIAGES, in the Year 1927.

(Compiled from the Quarterly Returns of the respective Registrars-General)

| Countries | [000's omitted] | | Births. | Per 1,000 of popula- tion. | Deaths. | Per 1,000 of popula- tion. | Mar- riages | Per 1,000 of popula- tion. |
|--|---------------------------------|---|---------|--|---------|--|----------------|--|
| | Area in statute acres. | Popula- tion middle 1927, estimated | | | | | | |
| | | No. | No. | Ratio | No. | Ratio | No. | Ratio. |
| England and Wales ... | 37,338 | 39,290 | 654,969 | 16·7 | 484,636 | 12·3 | 307,818 | 7·8 |
| Scotland ... | 19,070 | 4,895 | 96,669 | 19·8 | 65,830 | 13·5 | 32,589 | 6·7 |
| Northern Ire- land ... | 3,352 | 1,253 | 26,699 | 21·3 | 18,226 | 14·5 | 7,191 | 5·7 |
| Great Britain and North- ern Ireland | 59,760 | 45,438 | 778,337 | 17·1 | 568,692 | 13·4 | 347,598 | 6·7 |
| Irish Free State ... | 17,019 | 2,958 | 59,980 | 20·3 | 43,685 | 14·8 | — | — |

CORRIGENDA.

Part II, pp. 301, 302.

IRISH FREE STATE.—Death rate, 4th quarter. *for* 13·2 read 13·3; marriages, 4th quarter: 3,092, rate 4·2; total marriages, 1927: 13,467; rate 4·6.

DUBLIN REGN. AREA.—1st quarter: births, 2,661, deaths, 2,503.

CORK REGN. AREA.—2nd quarter: deaths, 296.

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TRADE AND THE GOLD STANDARD.

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the Rt. Hon. Viscount D'ABERNON, G.C.B., G.C.M.G., in the Chair.]

THE restoration of the gold standard in the spring of 1925 was the culminating point of a policy designed to that end and pursued since the close of the war. An examination of the relation between that policy and the course of prices is, consequently, necessary, and the movements of British trade have also to be analyzed for the purpose of finding out, if possible, how far they were determined by monetary influences and how far by other factors. The post-war boom of 1919-20 was followed by the slump of 1920-1, and many important critics have assigned to the banking policy which was pursued the chief blame for the catastrophe. In truth, the feverish speculation of the boom period had by the spring of 1920 imbued the minds of all thinking men with a sense of coming trouble, and the collapse of the Japanese speculative mania and the "consumers' " strike in the United States in the early months of that year provided the impulses which sent the crazy edifice of credit crashing all over the world. Prices deflated themselves, and with prices credit too was deflated; the result may have been in accordance with the desires of the financial authorities, it was not in the main due to their direct action. A second stage in the policy is alleged to have begun in 1922. "Deflation, even rigorous deflation," said Mr. McKenna to his shareholders, "was a harsh necessity in 1920 and 1921. Its continuance in varying degrees of intensity during

the following three years, after the United States had abandoned the process, was based on the desire to effect an early return to the gold standard." (Midland Bank: *Monthly Review*, January–February, 1927.) Mr. McKenna has always been a stout opponent of the "deflationary policy," and his admission, quoted above, makes it unnecessary to examine in further detail the events of 1920 and 1921. Since, however, he alleges a difference in banking policy in the United States and the United Kingdom, beginning in 1922 and leading in the former country to prosperity through an abundant supply of credit, and in the latter to depression through restriction of credit, some examination has to be made of the financial history of the period from 1922 to the restoration of the gold standard in the United Kingdom in 1925.

The rate of exchange expresses the terms on which the money of one country can be applied to effect purchases in another country with a different currency. Where both countries are on a gold basis it is determined by the gold content of the units of currency, and in a condition of equilibrium indicates that the general level of gold prices of commodities (relative to any base period) is the same in the two countries. If some external cause raises or depresses prices in one of these countries the exchange will move in a counter-acting manner, and will ultimately so affect trade as to bring prices in the two countries back to their normal relation. Before the war the principal rates of exchange only varied between the gold points at which it was profitable to import or export gold, but after the war many of these rates involved currencies, one or both of which was based on inconvertible paper. The problem thus became more complicated, because prices in countries with depreciated paper currencies moved often with considerable violence and were immediately affected by the currency policy of the time. Account also had to be taken of the fact that gold itself had depreciated in terms of commodities, and of the other fact that the exchange might be directly affected by influences arising from monetary transactions other than the purchase and sale of commodities and even by psychological causes with no material basis. If, from whatever reason, the demand for dollars were greater than the demand for £s, the dollar value of the £ would fall. If in one of the two countries the general level of prices fell relatively to the other, that country would have an export advantage and the exchange would turn in its favour. If, for some reason not connected with commerce, the exchange turned in favour of one of them, then prices in that country would tend to fall relatively to prices in the other country. These are the main movements in which exchange and prices are mutually affected.

I. The Period 1922 to 1925.

Without any assistance from bank policy, business in the United States began to rise out of the slough in the second half of 1921, and by the middle of 1923 a period of expansion was in full development, to last till well on in 1927. During the second half of 1921 the American wholesale price index-number averaged 141; in April 1923 it reached 158·7, a rise of 12·6 per cent., and then fell slowly till the middle of 1924. The depression in the United Kingdom lasted much longer and prices continued to fall during 1922, while the advances of the London Clearing Banks only began to increase about the middle of the year. Business gradually improved, unemployment declined, and frozen loans were slowly liquidated. This movement was aided by the reduction of the Bank rate to 3 per cent. in July, 1922. The fall in British prices coincidently with the rise in American prices tended to turn the dollar exchange in our favour, and the appreciation of our courage in beginning payments on account of our Government debt to the United States helped to cause an over-valuation of the £ for external purposes.

In the first quarter of 1923 the British wholesale price index-number was 58 per cent. above the 1913 base, while the United States index-number was 57 per cent. above that level. Prices continued to fall in the United States, especially prices of grain and wool among raw products, while improving trade and a better organization of industry cheapened finished goods. Despite our dependence on the United States for food and raw materials, prices kept on rising in the United Kingdom, largely on account of the unhealthy stimulus given to the coal and iron trades by the French occupation of the Ruhr. The increase in the prices of these basic commodities hampered our industries in their revival and caused increased demands to be made on the banks for assistance. The strained position of credit and the difficult political situation forced a raising of the Bank rate to 4 per cent. on July 5, 1923. The necessity of meeting payments on the American loan also tended to turn the dollar exchange against us, with the ultimate effect of reducing our home prices so as to restore our external purchasing power.

Prices in 1924 were affected by a rise in the prices of cereals and meat, especially in the second half of the year, and by a fall in cotton, following in these cases prices in producing countries determined by the magnitude of the crops, and beyond our control. The cessation of the Ruhr boom also produced a fall in the prices of iron, coal, and steel. The quarterly movement of these several prices is shown on the next page.

| Period. | All Food. | Total not food. | Iron and steel. | Coal. | Cotton. |
|-------------------|-----------|--------------------|--------------------|-------|---------|
| 1924. | | | | | |
| First Quarter ... | 164.1 | 166.9 | 147.7 | 184.5 | 227.9 |
| Second „ ... | 158.7 | 166.4 | 145.5 | 180.8 | 232.3 |
| Third „ ... | 165.3 | 164.4 | 141.5 | 164.8 | 225.8 |
| Fourth „ ... | 177.4 | 166.0 | 136.8 | 160.4 | 225.2 |
| 1925. | | | | | |
| First Quarter ... | 174.8 | 164.9 | 134.2 | 155.8 | 233.0 |

At the same time prices in the United States rose from the second quarter of the year. A practical parity of purchasing power had been attained in the second quarter of 1924, when the exchange averaged 4.343, or 10.7 per cent. below the par of exchange; in the fourth quarter the exchange was 4.598, whereas with British and American prices what they were, parity of purchasing power would, theoretically, have been achieved with an exchange of \$4.405 to the £. The £ was, apparently, “over-valued” at that time for external purposes by 4.38 per cent., but too much stress must not be put on this measure; our index-numbers cannot register as finely as that.

In the first quarter of 1925, prices both in the United States and the United Kingdom fell; grain being lower in Britain and American iron prices being affected by European prices. The dollar exchange rose to 4.777. Clearly, some extraneous influences had come in to raise the value of the £, principally the bull speculation by foreigners and others in the £ arising from the knowledge that the Act prohibiting the export of gold was due to lapse in the course of 1925. Similar speculation has occurred in the case of all depressed currencies rising near to their pre-war value, and it could only have been prevented if the Government had notified their intention not to resume, or to postpone the resumption of, the gold standard. Any such intimation would have started a bear speculation, which would have ruined any hopes of London regaining its position as the financial centre of the world. So far as such speculation raised the external value of the £, it may be said to have produced a true “over-valuation.” Another factor was the increase in new foreign loans floated in the United States from \$413.7 millions in 1923 to \$87.8 millions in 1924. To transmit such a sum involved a depreciation of dollars, and in some cases the loans were transferred to the borrowers by way of the United Kingdom (it being more convenient to hold the money there), thus producing a demand for £s and an appreciation of sterling. Over-valuation of the £ for external purposes stimulated purchases abroad and gave the United States an apparent export advantage over the United

Kingdom during the third and fourth quarters of 1924 and the first and second quarters of 1925. The improvement in industry and in our financial position is shown by the sharp increase in the advances of the London Clearing Banks during the last quarter of 1924 and the first quarter of 1925. These advances had averaged £790.1 million in the first quarter of 1924, and a year later were £843.1 million; the increase was 6.7 per cent. nominally, but allowing for the rise in the average level of prices the growth in purchasing power was only 5 per cent. Probably, frozen loans had been liquidated by that date, but, so far as they still existed, only the new advances had increased purchasing power. We may sum up the survey of the situation prior to the restoration of the gold standard by noting that the volume of the import trade of Great Britain and Ireland in 1922 was 85.8 per cent. of the 1913 volume, in 1923 it was 93.3 per cent., and in 1924 it was 104.0 per cent.; the volume of re-exports in the three years was 81.5 per cent., 88.7 per cent., and 88.4 per cent., so that the quantities of imports retained for use or consumption at home increased. The volume of the exports of United Kingdom goods grew from 68.9 per cent. of the 1913 volume in 1922 to 74.6 per cent. in 1923, and to 76.1 per cent. in 1924.

II. *The Restoration of the Gold Standard.*

The Chancellor of the Exchequer in his Budget speech on April 28, 1925, announced that, subject to certain conditions, a general licence would be given to the Bank of England to export gold as from that day. In preparation for this effective restoration of the gold standard the Bank rate had been raised to 5 per cent. on March 5. The Committee on the Currency and Bank of England Note Issues had reported to the Chancellor a month earlier that "it is possible that some temporary increase in money rates will be necessary to bring about the necessary adjustment of sterling prices to the gold level." On this point it is important to observe that Mr. Keynes said that he did not "believe that a somewhat higher Bank rate would do any harm, in view of the present tendencies of the price-level, and that, in any case, the maintenance of our own equilibrium will soon require the support of a higher rate" (*Nation*, February 21, 1925, quoted by Professor Gregory in *The First Year of the Gold Standard*, p. 40). Since the middle of the year the market rate of discount had been rising both in London and New York. Other measures taken to avert a possible drain of gold and pressure on the exchanges were the anticipatory purchases of dollars for all payments on account of the American debt, and the guarantee of a credit of 300 million dollars in the United States for use when

necessary (it was never used). The unofficial embargo of the Bank of England on the issue of new overseas securities on the London market, which existed during the first ten months of 1925, was designed to the same end. Such securities, which had been £66·5 million in the first half and £67·8 million in the second half of 1924 were only £39·2 million in the first half and £48·6 million in the second half of 1925; foreign issues alone fell from £60·75 million in 1924 to £30·25 million in 1925. Since, however, British subscriptions to securities issued in foreign centres could not be prohibited, and the actual export of money or goods does not necessarily correspond closely with the period of issue, the effectiveness of the embargo in preventing export of capital is doubtful. Whatever effect it may have had in this direction reduced the offer of £s, and so maintained the exchange for the time being, but the tendency of such measures is in the long run to hamper export trade.

The price history of 1925 and of the first four months of 1926 preceding the coal stoppage is summarized below :

| Period. | Total Food. | Total not Food. | Iron and Steel. | Coal. | Cotton. |
|-------------------|-------------|-----------------|-----------------|-------|---------|
| 1925. | | | | | |
| First Quarter ... | 174·8 | 164·9 | 134·2 | 155·8 | 233·0 |
| Second „ ... | 166·3 | 155·3 | 125·5 | 147·7 | 218·9 |
| Third „ ... | 163·4 | 151·9 | 123·0 | 142·2 | 207·0 |
| Fourth „ ... | 161·7 | 148·0 | 119·0 | 139·0 | 183·9 |
| 1926. | | | | | |
| First Quarter ... | 157·0 | 143·4 | 118·1 | 141·0 | 171·2 |
| April ... | 151·7 | 139·0 | 117·2 | 142·1 | 162·2 |

In January, 1925, the total index-number was 171·0; in April, 1926, it was 143·6, a fall of 16 per cent. Over the same period the United States index-number fell from 160·0 to 151·5, a fall of 5·3 per cent. “Consumers’ goods” in the United States fell by about 3·6 per cent. and raw materials by 9 per cent., some of the reductions being very large, *e.g.* 20 per cent. in raw cotton (at New York) and 16 per cent. in wheat. Considering the dependence of the United Kingdom on the United States for important food-stuffs and raw materials, it is fair to conclude that the reductions in the United States in the prices of these commodities were transferred to prices in the United Kingdom and were increased by the appreciation of 1·8 per cent. in the dollar value of sterling. The fall of 15·1 per cent. in food-stuffs in the United Kingdom (from 178·6 in January, 1925, to 151·7 in April, 1926) is thus accounted for, and it should be noted that this reduction, by increasing real wages,

strengthened the home market for the products of British industries. The fall in the average prices of commodities other than food in the United Kingdom was 16.6 per cent. (from 166.6 in January, 1925, to 139.0 in April, 1926), and over half of this would be accounted for by lower prices for raw materials, which again would strengthen the competitive power of British manufacturers.

To attribute the fall in prices to the restoration of the gold standard is at least exaggerated, the fall in United States prices (which in part determined British prices) being, as has been shown, due to factors inherent in the changing structure of American industry. A residual reduction, however, remains to be accounted for, and an explanation may be found in the character of some of our markets. Between the first quarter of 1925 and April, 1926, the average fall in the prices of all kinds of raw cotton was about 30 per cent., while, even without allowing for the necessary time-lag, the average price of cotton yarns fell by 32.5 per cent. Factors affecting the markets for finished goods would appear to be the efficient cause, and chief among these would be the competition of low-priced Indian and Japanese cotton goods in our principal markets.

The competition of countries with currencies which were depreciating in terms of gold while sterling was appreciating was a species of exchange dumping which forced down the price of British goods below the prices corresponding to those obtainable in countries with a gold currency. We cannot place sufficient reliance on the correspondence of the British, French, and Italian index-numbers of wholesale prices to use the ordinary conventional methods of calculating the export advantage of the last two countries. The export advantage of France unquestionably increased during 1924, but it would appear to have been somewhat less, despite the restoration of the gold standard, in April and May, 1925. The war in Morocco and M. Caillaux's budget troubles, however, soon upset the international valuation of the franc. France being self-contained to a greater extent than most European countries, internal prices only responded slowly to changes in the exchange value of the franc, which, in gold, depended mainly on the needs of the French Government, the view which the international money market formed of the capacity of that Government to meet its obligations, and the efforts of French capitalists to avoid loss by resorting to the "flight of the franc" to countries with more stable currencies. The sluggish internal response of the franc to international forces gave a continued economic advantage to the export trades of France, and, though the country as a whole was bound to suffer through the unfavourable situation of the national finances, this export advantage

forced down British export prices of competitive goods below the level to which they would have been brought by the fall in raw materials and the appreciation of the £. What was true of France was true also in varying degrees of Belgium and Italy, and explains the power of Belgium to depress British iron and steel prices during the period under review.

Germany returned to the gold standard from November, 1924, and, though since that time she has not indulged in exchange dumping, she has had a powerful influence on our coal trade. The British coal trade had been stimulated during the French occupation of the Ruhr in 1923, and after normal conditions were restored there was a slight recession. During the first five months of 1925 the output in Great Britain was 10 per cent. less than during the corresponding period of 1924, but the output of hard coal in Europe was maintained and that of lignite considerably increased. The decrease of manufacturing production in Europe, greater economies in the use of coal, the competition of lignite, oil, and electricity produced by water-power were all factors which contributed to the result that more coal was being produced than could be used. Stocks of hard coal in the Ruhr and German Silesia rose from 531,000 metric tons at the end of 1922 to 2,989,000 metric tons at the end of December, 1924; at the end of May, 1925, the stocks were 4,000,000 tons of hard coal, 2,960,000 tons of coke, and 151,000 tons of briquettes, equivalent to about 7,800,000 metric tons of coal, or about 13·1 per cent. of the output of coal in the first five months of 1925. Some mines were then shut down, but at the end of 1925 the stocks were equivalent to about 6,700,000 metric tons of coal and at the end of April, 1926, to nearly 7,800,000 metric tons. Stocks were larger also in Poland and in Belgium. The effect on prices was serious. In Germany, Rhenish-Westphalian Fettförderkohle, which had been 20·60 reichsmarks per metric ton since December, 1923, was reduced to 16·50 reichsmarks from July, 1924, and to 15 reichsmarks from October, 1924; the reduction in the year was 27·2 per cent. Export prices fell much less for British coal, about 11 per cent. for S. Wales large steam coal and about 17 per cent. for Fifehire Navigation between March and December, 1924; for Northumberland unscreened, however, which the German Statistischesamt take as a suitable class of coal for comparison with German, the fall was from 22s. 11d. in March to 15s. 6d. in December, 1924, or 32 per cent. German coal prices fell very little in 1925 and reached 14·87 reichsmarks in April, 1926, when they were about 12·4 per cent. above the pre-war level of 12 marks. Comparing monthly average prices, South Wales large steam coal fell by 15·4 per cent. in 1925 to 20s. 6d. in January, and then rose to

23s. 6d. at the end of April; Fifeshire Navigation fell by 13.5 per cent. in 1925 and rose by 1.4 per cent. to 21s. in the first four months of 1926; Northumberland unscreened fell in 1925 by about 13 per cent. to 13s. 6d. in October and (except for a slight rise in February, 1926) remained at that price till April, 1926.

The over-production of German and Polish coal was, undoubtedly, the cause of the fall in the prices of British coal, especially, in the first instance, of those qualities usually exported to the Continent, though ultimately all were affected. The worst part of the fall took place in 1924, and was quite out of proportion to the increase in the dollar value of sterling; during most of that year the value of the mark fluctuated within narrow limits, and its dollar value improved by less than 7 per cent. till it was stabilized in November. The coal trade of the United Kingdom felt the shock of the reduction in prices the more severely because it could not profit much by the increased purchasing power of sterling, pit-timber being practically its only imported material, and mining wages were not directly governed by the cost of living. The iron and steel industry, which had developed during the war beyond its peace-time needs and afterwards fell into depression, shared with the coal trade the artificial and temporary prosperity created by the French occupation of the Ruhr, and also the retrocession that followed the end of that venture. The iron and steel index-number fell by 21.4 per cent., from 149.2 in December, 1923, to 117.2 in April, 1926, but the trade had some relief from the fall of 50 per cent. in the price of Durham furnace coke, from the increased purchasing power of sterling in procuring imported ores, and from the dependence (though with a lag in time) of wages on prices. Its most serious danger arose from the exchange dumping practised by Belgian and French iron-masters. In addition (according to *The Economist*, April 11, 1925, p. 699), the Continent benefited by "lower transport charges, lower rates and taxes, and lower capital costs. Thus the French industry secured the magnificently equipped Lorraine works at an exceedingly low figure; the Belgian works were rebuilt very largely with moneys procured from the Belgian Government, and Belgium is now obtaining from her new plant an output of at least 20 per cent. in excess of her pre-war record; the Germans extended and improved their works in the Ruhr with the money obtained from their Government in compensation for the loss of their pre-war properties in Lorraine, and as a result of inflation greatly diminished their debenture charges. In the Continental countries labour works for longer hours and at cheaper rates."

The foregoing survey shows that wholesale prices in the United Kingdom were affected by several sets of causes. If the appre-

ciation of the £ in dollars had been the only factor and American prices had not fallen, parity in purchasing power would, theoretically, have been achieved by a very moderate reduction, less than 2 per cent., in British wholesale prices. The contemporaneous fall in prices, especially of food-stuffs and raw materials, produced a reduction in the United States and a greater reduction in this country, whose manufactures had not the advantage of a very large and protected home market in which the prices of finished goods could be maintained; consumers' goods in the United States fell by a much smaller percentage than raw materials. Apart from factors affecting the production of goods, other factors working on markets brought down sale prices. Such was the extreme depreciation of certain currencies, especially French, Belgian, and Italian, arising out of the financial policy of the national governments and not out of anything to do with sterling; this depreciation permitted exchange dumping on a large scale. The over-production of coal and the consequent slaughtering of prices exemplifies once again the difference of conditions between Europe and America.

The year 1925, as already observed, was one of great prosperity in the United States, but it was otherwise in Europe, where stagnation ruled. So far as concerns the United Kingdom and the Irish Free State taken together we have the following comparison of movements of volume of trade, the whole year 1924 being compared with the whole year 1913, and the respective quarters of 1925 and 1926 with the corresponding quarters of 1913:—

| Period. | | | | | 1913 = 100. | |
|---------|---------------|-----|-----|-----|--------------|------------------------|
| | | | | | Net Imports. | Exports of U.K. Goods. |
| 1924. | Year | ... | ... | ... | 106·6 | 76·1 |
| 1925. | First Quarter | ... | ... | ... | 117·6 | 81·3 |
| | Second „ | ... | ... | ... | 120·1 | 71·9 |
| | Third „ | ... | ... | ... | 100·5 | 72·2 |
| | Fourth „ | ... | ... | ... | 109·0 | 78·7 |
| | Year | ... | ... | ... | 111·8 | 76·0 |
| 1926. | First Quarter | ... | ... | ... | 117·9 | 80·3 |

Taking the year as a whole these figures indicate no increase in export trade in 1925 over 1924 and a possible increase of about 5 per cent. in home trade, apart from any changes due to home crops and home raw materials, and if there was no stocking of imported

materials; there was a fall of 6.0 per cent. in the consumption of coal at home in 1925 compared with 1924, and the value of farm production in England and Wales in 1925 (£225,000,000) was probably less than in the previous year. The percentage of insured work-people unemployed in Great Britain and Northern Ireland increased from a monthly average of 10.3 in 1924 to 11.3 in 1925. Even if there was some offset in increased efficiency and in greater use of power to justify the increase in general wages from 70 to 75 per cent. over July, 1914, in 1924, to 75 per cent. in 1925, there does not appear to be any reason for supposing that the total output of the United Kingdom was not rather less in 1925 than in 1924. Such a state of affairs would naturally have a tendency to reduce prices.

During 1924 credit facilities became gradually dearer, the rate for three-months bank bills rising from a mean of 3.33 in January to 3.74 in December; it further hardened in the New Year, and on March 5, 1925, following a rise in the New York re-discount rate, the Bank rate was raised to 5 per cent. This, of course, was a handicap on trade and industry, though probably not a severe one, and there was little criticism. It operated directly to maintain the exchange by attracting money to London, and the embargo on foreign loans also tended to make money plentiful there.

Neglecting the speculative movement of the autumn of 1924, the direct effects of the return to the gold standard may be said to begin with the raising of the Bank rate to 5 per cent. on March 5, 1925. "Such a movement," said *The Economist* ("Banking Supplement," May 9, 1925, p. 4), "has a psychological effect upon industrialists which is quite out of proportion to the actual increase in the cost of financing industry. In these days of after-war neurosis the Bank has to reckon with a new factor in the shape of hysterical exaggeration in considering the effects that may be produced by a rise in its rate." This acid comment was justified, for *The Economist* on March 21 had shown that 63 companies had disclosed that their bank loans amounted to 11½ per cent. of their paid-up capital, so that "if every company were compelled to pay the full 1 per cent. increase for the accommodation, the increase in working expenses would amount to little more than one-tenth of 1 per cent. of the paid-up capital." Nevertheless, the effect of a change in the Bank rate depends upon the condition of trade at the time, and the leaders of the "heavy" exporting industries which had little share in the relatively good export trade of the winter half-year of 1924-5 could be pardoned for dismay at even a slight increase in their financing costs, especially when it was to be followed, as everyone knew, by

a further increase in bringing the £ up to par. It is from these industries that the crusade of criticism against the return to gold has since been directed, and, in any case, as Professor Pigou has shown, the importance of psychological factors in influencing trade movements is not to be neglected. The immediate effects, however, were not conspicuously bad. In the first quarter of the year there had been an excess of exports over imports of gold coin and bullion amounting to £3,095,000, but in the second quarter there was an excess of imports amounting to £3,059,000, and the gold coin and bullion in the Bank of England and Currency Notes Redemption Account increased from £155,721,000 on April 1 to £157,603,000 on July 1, the Redemption Account gold having meanwhile been transferred to the Bank and replaced by notes. This increase made for an expansion of credit, but at the same time the practice of supplying the money market with funds through the purchase of securities by the Bank was discontinued, and "the discount houses did not welcome enthusiastically a state of affairs in which the market rate was kept in touch with the Bank rate by the more frequent necessity to borrow, not by disposing of short Treasury bills on reasonable terms to a semi-official intermediary, but directly from the Bank at the usual $\frac{1}{2}$ per cent. above Bank rate. Even in Lombard Street, however, these inconveniences are generally regarded as worth suffering in order to restore our currency to its old prestige" (*Economist*, July 4, 1925). After the mid-year squeeze discount rates eased off and the Bank rate was reduced to $4\frac{1}{2}$ on August 6, giving industry "a certain relief." A further reduction, unexpected in view of approaching heavy payments to America for grain and cotton, was announced on October 1 to 4 per cent., but the Bank of England stock of gold had risen to £164,500,000 on August 5, and on September 30 had only fallen to £160,467,000. Between April and September, 1926, the Board of Trade index of wholesale prices in the United Kingdom had fallen by 4.2 per cent., the United States Bureau of Labor Statistics index-number had risen by over 2.2 per cent., and the dollar value of the £ had improved from an average of 4.796 to an average of 4.847, or by nearly 1.1 per cent.

The "injury" inflicted on industry by the rise in the Bank rate (which was an essential part of the restoration of the gold standard) was thus of short duration, and the "over-valuation" of the £ which began through speculation about the middle of 1924, discouraging exports and encouraging imports, had disappeared rather earlier. A further assistance to industry and trade was accorded through the improved purchasing power of bank advances, as is shown by the following table:—

Advances of London Clearing Banks.

| Average of | Amounts advanced. | Purchasing Power. | |
|------------------------|----------------------|-----------------------------|------------------------------|
| | | At Prices of June, 1924. | At Prices of March, 1925. |
| | £,000 | £,000 | £,000 |
| June, 1924 | 808,279 | 808,279 | 791,724 |
| March, 1925 | 837,143 | 875,076 | 857,143 |
| September, 1925 | 850,824 | 811,579 | 794,937 |

Nevertheless, industry was not in a happy condition during a great part of 1925. The table on p. 316 shows the exports of some leading classes of British produce and manufactures in 1924 and up to the eve of the coal stoppage in 1926.

In most of these classes of goods a general increase through 1924 is shown, but the second and third quarters of 1925 show reductions on the first quarter, except in earthenware, paints, soap, and motor-cars, though jute piece-goods and sodium compounds show increases in the second quarter followed by reductions, and motor-cars show a decline in the second quarter followed by an increase. In cotton the causes of the reduction in exports were the disturbances in China and unusually bad trade with India, which, however, began to revive in the third quarter. The woollen and worsted industry was thoroughly disorganized in 1925 by the reaction from the inflated prices of the winter of 1924-5 caused by unjustified alarm as to a scarcity of supplies; it was impossible to sell goods on the basis of the prices at which the material had been bought. The same considerations, doubtless, affected the imports of materials. In vehicles there was a heavy reduction in the exports of new ships, in these days a spasmodic export.

The production of coal in the winter of 1924-5 had been below that of the preceding winter, and in the second and third quarters of 1925 the tonnage raised was 11·7 per cent. less than in the corresponding period of 1924. The output of pig iron fell continuously, quarter by quarter throughout 1924 to the third quarter of 1925; so too did the output of steel except for moderate increases in the winter quarter of 1924-5. These reductions were due to the fall in prices already explained. A complete stoppage in the coal industry was threatened because the miners refused to consent to a reduction in wages, and was only averted by the Government agreeing to make good to the owners the losses consequent on the payment of the existing rates of wages for a period of nine months while a Royal Commission enquired into the condition of the industry. The promise of this subsidy was followed by a moderate improvement in

trade in the third quarter of the year, which was probably due partly to the relief at the removal of the fear of an immediate stoppage, partly to the usual autumn revival of trade, and partly to a differential fall in British compared with American prices which created an export advantage for this country. The subsidy amounted to £19,000,000 up to the end of the financial year and to about £24,000,000 altogether, and was met by borrowing, the results on the floating debt being obscured by the conversion of debt. It thus caused a concealed inflation which would have the tendency of making the fall in prices less abrupt than it would otherwise have been. In the long run, of course, it had to be paid for, but its immediate effect was stimulating to trade, although it did not increase the output of coal.

The removal of the embargo on foreign loans, cheaper cotton, cheaper coal (enabling an improvement in the output of iron and steel), a more normal position in wool prices—all these made for an improvement in overseas trade, and there was a reduction in unemployment from 12.1 per cent. (1,442,966) in August to 10.5 per cent. (1,243,087) in December, a lower figure than when the gold standard was restored (1,294,481) in April. Unfortunately the growth in imports led to withdrawals of gold and to a fall in the exchange, and the stock of gold at the Bank of England fell from £160,467,000 on September 30 to £145,660,000 on December 2. Consequently, and in accordance with expectation, the Bank rate was raised again to 5 per cent. Despite the calling in of loans for "window-dressing" purposes, the Advances of the London Clearing Banks increased from £850,823,000 as the average of September to £863,198,000 as the average of December, or by nearly 1.5 per cent., while, taking into account a fall of rather over 3.3 per cent. in the level of wholesale prices, the purchasing power of the advances had increased by more than 3.5 per cent. The year, therefore, ended on an optimistic note. Compared with December, 1924, there was in December, 1925, a fall of 10.6 per cent. in British wholesale prices and only one of a half of one per cent. in the United States level. According to the League of Nations *Monthly Bulletin of Statistics* (No. 1, 1926) the dollar value of sterling had increased in the same time by 3.5 per cent., while the dollar value of French francs depreciated 30.8 per cent., of Belgian francs 8.8 per cent., and of Italian lire 6.3 per cent. That the international situation was still serious was, however, shown by the Board of Trade estimate that the credit balance of the United Kingdom in all transactions (other than the lending and repayment of capital on private account) had fallen from £86,000,000 in 1924 to £54,000,000 in 1925—or, with less fictitious appearance of accuracy, from a sum lying between £75,000,000 and £100,000,000

in 1924 to a sum lying between £40,000,000 and £80,000,000 in 1925. New overseas issues had been £134,000,000 in 1924, but fell, in consequence of the "embargo," to £88,000,000 in 1925, the balance of investment money coming from transactions involving the temporary movement of capital from one country to another, or from sinking funds, or from sales of securities.

Trade continued good in the first quarter of 1926, and there were substantial increases in the output of coal, iron, and steel. The exports of all British produce and manufactures were nearly up to the volume of the first quarter of 1925, and so also were the exports of manufactured goods alone. This improvement in export trade was unevenly distributed, the metal, pottery, and paper trades being those that showed most improvement. In the first quarter of the year bank deposits are always depleted by Government revenue collections, and in that period of 1926 deposits in the London Clearing Banks were reduced by nearly £60,000,000, or by under 3·7 per cent., but nevertheless by various decreases in other assets advances to customers were increased to £892,290,000 in March, or by 3·4 per cent. above the December average, involving an increase of 9·6 per cent. in purchasing power, wholesale prices having fallen by 5·3 per cent. This fall in prices was mainly due to decreases in cotton and food-stuffs, and in the same interval the level of United States prices sank by 3 per cent. Although some hesitation developed owing to uncertainty as to the solution of the coal problem, the unemployment percentage fell from 11·1 in January to 9·8 in March and 9·2 in April. Indeed, as time went on, that uncertainty led to a greater desire to secure stocks of coal and other goods and to complete contracts before any untoward event occurred. The ordinary spring revival also helped to increase business. Production in the United States did not seem likely to decline, but, on the other hand, there was great depression in Germany, France was suffering from inflation, and a reaction in Italian production seemed probable. But for the unhappy state of affairs in the coal industry and the depressed condition of shipping, where freights were below the pre-war level, there was general confidence that British trade was definitely on the up grade. The General Strike and the coal stoppage, however, began early in May, and for seven months British industry suffered serious restriction.

At this point it will be advantageous to sum up the various changes that took place between June, 1924, and April, 1926. The Board of Trade index-number of wholesale prices fell by 11·7 per cent., from 162·6 to 143·6, after rising to 171 in January, 1925. The United States index-number was 144·6 in June, 1924, rose to 161 in March, 1925, and fell to 151·1 in April, 1926, showing a net

rise of 4.5 per cent. If the datum line is taken at January, 1925, the price fall in the United Kingdom was 16 per cent. and in the United States 5.6 per cent. Sterling appreciated in terms of dollars by 12.6 per cent. from June, 1924, and by 1.7 per cent. from January, 1925, while the dollar value of French francs fell by 35.5 per cent. from June, 1924, and by 37.2 per cent. from January, 1925, and Italian currency in terms of gold depreciated by 7.2 per cent. from June, 1924, and by 3.5 per cent. from January, 1925. Exports of British goods in the first quarter of 1926 were in volume only about 1.4 per cent. below the exports of British goods in the first quarter of 1925, and 7 per cent. greater than in the first quarter of 1924. Retained imports of raw materials in the first quarter of 1926 (which were affected by the uncertainty of the coal future) were 8.6 per cent. less in volume than in the first quarter of 1925, but 19.3 per cent. greater than in the first quarter of 1924. Other retained imports (food and manufactures chiefly) in the first quarter of 1926 were 3.9 per cent. greater in volume than in the first quarter of 1925, and 15.4 per cent. greater than in the first quarter of 1924. The percentage of insured persons unemployed, which had been 10.50 per cent. in the first four months of 1924 and 11.12 per cent. in the first four months of 1925, was 10.15 per cent. in the first four months of 1926. Bank accommodation to trade and industries as measured by the advances of the London Clearing Banks rose from a weekly average of £806.9 million in the second quarter of 1924 to £865.5 million in the second quarter of 1925, and to £881.9 million in the first quarter of 1926, but, if allowance is made for the fall in prices so as to represent purchasing power, the 1925 figure is raised to £889.6 million and the 1926 figure to £980.1 million—increases of approximately 10.2 and 21.5 per cent. respectively. On the part of the Government we have to note an increase in national expenditure chargeable against revenue from £788.8 million in 1923-4 to £795.8 million in 1924-5 and to £826.1 million in 1925-6, while the nominal debt liability was reduced from £7,747 million on March 3, 1924, to £7,714 million on March 31, 1925, and to £7,691 million on March 31, 1926; in the two years the floating debt was reduced by £70.2 million. *The Economist* in its "Banking Supplement" (May 29, 1926, p. 4) expressed the view that "the period of little more than twelve months which has elapsed since our re-adoption of the gold standard has passed with remarkably little incident and few serious difficulties." Indeed nearly one-third of the fall in prices between January, 1925, and April, 1926, took place in the first four months of the year, when speculation in exchange was active, and any fall in production that took place in the next five months was nearly made good in the following seven, though

not without much loss to the trades in the weakest economic position.

III. *The Coal Stoppage and after.*

The coal stoppage began on May 1, 1926, involving immediately 1,075,000 miners. On May 4 the general strike began and lasted till May 12, when it was called off, work being resumed a few days later; 1,580,000 persons took part in it. Excluding coal-mining, the percentage of unemployment, which had been 9.2 per cent. in April, rose to 14.2 per cent. in June, and gradually sank to 13.3 per cent. in November; in December, when coal-mining was gradually resumed, the percentage fell to 11.7. Exports of British goods in the second quarter of 1926 were reduced to 62.4 per cent. of the volume of exports in the second quarter of 1913; in the third quarter of 1926 they were 65 per cent. of the exports of the third quarter of 1913; and in the fourth quarter of 1926 they were 64.2 per cent. of the exports of the fourth quarter of 1913. Excluding coal, exports of British produce and manufacture were in volume only 10.6 per cent. less in the last three quarters of 1926 than they were in the last three quarters of 1924, and 9 per cent. less than in the corresponding period of 1925. This was a far better result than could have been expected, but it was secured at the cost of the purchase of imported coal and coke to the value of £45,500,000. The production of coke, iron, and steel practically ceased, while the output of tinplate, sheets, pottery, bricks, and constructional engineering was seriously affected. Employment in cotton trades and in the wool textile industry improved rapidly after July. The deficiency in iron and steel supplies was made good by increased imports, the volume of retained imports in 1926 being nearly a third greater than in 1925, and our foreign competitors seized the opportunity to capture a large part of our overseas markets in iron and steel, as well as in coal. We thus had more supplies to buy and less goods to buy them with, and, whereas in 1925 we exported on balance £8,214,000 of gold coin and bullion, we imported on balance £11,398,000 in 1926, of which £8,761,000 was in the last nine months. The net effect on the international revenue transactions of the country (*i.e.* excluding the lending and repayment of capital) was that probably a small debit balance was shown at the end of the year. The situation would have been much worse but for the fact that we were now receiving as well as paying on account of international Government debts, so that overseas payments to and by the British Government practically balanced.

The Board of Trade index-number of wholesale prices rose slowly from 143.6 in April, 1926, to 152.4 in November, an increase of 6.1

per cent., and then fell to 146.1 in December; the April–November rise was compounded of 3.3 per cent. in food and 7.9 per cent. in other goods. The United States index-number fell from 151.1 in April to 148.1 in November (or by 2 per cent.), and to 142.7 in December. The dollar exchange naturally moved against us. The French franc fell to 197 to the £ sterling in July, 1926, when, although the wholesale price index-number averaged 787 in that month and 803 during August, France had an export advantage compared with sterling equivalent to the purchasing power of the £ being one-third greater in France than in Great Britain. Violent efforts were then made to valorize the franc, and, at the expense of the trading community, an apparently firm level was found in December round about 123 francs to the £. Italian currency, which had been stabilized at about 121 lire to the £ since October, 1925, began to deteriorate in May, 1926, and fell to an average of 147.4 in August, after which, through Government operations, it recovered to an average of 109.5 in December, a rate of exchange which apparently gave the £ nearly 10 per cent. more purchasing power in the United Kingdom than in Italy. Belgium came on to the gold standard in November, 1926. The year thus ended with the serious diminution of grave disadvantages under which British trade had laboured for years.

Throughout all the labour troubles the Bank rate was maintained at 5 per cent., although the New York rate, which had been reduced to 3½ per cent. in April, was raised to 4 per cent. in August. The Bank secured increased supplies of gold, and, despite the usual autumnal efflux, its stock of gold at the end of the year was £151,119,000 compared with £146,372,000 at the end of April. The advances of the London Clearing Banks rose from an average of £890,126,000 in April to an average of £903,131,000 in November, and to an average of £904,798,000 in December, but a large proportion of these enormous sums consisted of frozen loans which the borrowers could not liquidate owing to the interruptions of industry. The power of the banks to assist industry to revive by the grant of additional credit was thus severely limited. The immediate future was also made more difficult by the fact that the first quarter of the year is always a period of large revenue collections, which tend to deplete bank deposits.

The year 1927 opened under some good auspices. Cotton was below pre-war level, and this, it was expected, should stimulate trade; at the same time the trade organizations were trying to eliminate price-cutting. The wool textile industry was now, in a great degree, free from the "exchange dumping," and the French franc was stabilized at or near 124. A gleam of hope was coming to

the long-depressed shipbuilding industry, as shipowners, who had enjoyed a boom in importing coal, were ordering some fresh ships. On the other hand, it was uncertain at what level coal and iron prices would have to settle in order to regain the markets lost during the coal stoppage. The railways, in a desperate effort to make good their losses during 1926, raised their goods rates from the existing average of 50 per cent. above pre-war rates to an average of 60 per cent. above pre-war. Immediately, however, everyone was hopeful; there appeared to be a spirit of peace in industry and there was an accumulation of postponed orders in hand which enabled production to proceed at a good rate. Unemployment (including 201,000 coal-miners) was 12.1 per cent. in the third week of January, and fell steadily to 8.8 in May; there was then a reaction to 8.9 in June, to 9.3 in July, and to 9.4 in August.

May, in fact, appears to mark the completion of the old 1926 orders; it saw the maximum output of coal since the beginning of the year, and it was followed by a serious drop in the output of pig iron and steel. Expressed in terms of 1924 values, British exports in the first quarter of 1927 were equivalent to £195,000,000, compared with £207,000,000 in the same period of 1926; with £210,000,000 for 1925, first quarter; and with £193,000,000 in the first quarter of 1924. Exports of manufactured goods for the same periods were:—1927, £154,000,000; 1926, £165,000,000; 1925, £165,000,000; 1924, £148,000,000. Exports of coal were largely increased, but, in the fight to recover markets, at prices which left no, or little, profits. Retained imports were in volume nearly 30 per cent. more than in the first quarter of 1924, and 11.1 and 11.4 per cent. greater, respectively, than in the first quarters of 1925 and 1926, but they still contained large quantities of coal, iron, and steel purchased on long-term contracts made during the stoppage. Excluding coal, however, retained imports of raw materials were 9.4 per cent. greater in volume than they had been during the first quarter of 1925, when they were greater than in either 1924 or 1926. In immediate reaction from the high price level (152.4) of November, 1926, the Board of Trade index-number fell to 143.6 in January, 1927 (the level of April, 1926), and to 142.6 in February, after which for eight months it kept within 1 per cent. of 141. Food prices fell till May, when the seasonal rise in cereals brought them up again. Cotton appreciated steadily, especially after May, when fears of a short crop began to become acute. Coal and iron and steel fell continuously in the fight for markets, in the case of coal precipitately to July and then by 1 per cent. to October. The German index-numbers for coal and iron fell till May, when prices stiffened, the limits of competition having apparently been reached. The German

reductions were, however, on a moderate scale, while the Board of Trade general index-number fell by 3·2 per cent. from 146·1 in December, 1926, to 141·4 in October, 1927, and the coal index-number in the same period fell by 35·7 per cent., *i.e.* from 184·5 in December, 1926, to 118·6 in October, 1927, as compared with 142·1 in April, 1926. The United States general index-number of wholesale prices fell from 147·2 in December, 1926, to 145·3 in March, 1927, and to 143·7 in June, but recovered to 150·1 in October. The continued fall in the second quarter, when British prices were stiffening, is significant, and it was in no way due to bad trade in the United States. The index of productive activity in manufactures compiled by the Department of Commerce was 119 for 1923, 113 for 1924, 125 for 1925, and 128 for 1926, but it further rose to 131 for the first half of 1927 and was 136 in the second quarter of 1927 compared with 131 in the second quarter of 1926. Then, when prices were rising, the production index fell to 133 in October. Meanwhile, between December, 1926, and October, 1927, the dollar value of the £ had increased by two-tenths of 1 per cent.

This recital of the course of prices appears to show that in this year at least the dollar-sterling exchange had ceased to have any effect on domestic prices. This was partly because we had strengthened our gold position a little, the surplus of £1,187,000 of exports over imports of gold bullion in the first quarter of the year being followed by a surplus of imports amounting to £1,970,000 in the second quarter, and a further surplus of £4,817,000 of imports in the third quarter, making an import surplus of £5,600,000 for the nine months January to September, 1927. British prices also appear to have lost touch with American prices, the latter continuing to fall, presumably as the result of improved methods of production and distribution, while British prices were affected on the one side by changes in the values of raw materials and on the other by factors influencing Continental markets. In July the United States wholesale prices index-number began to rise, and in September reached 148·6, a point 3·4 per cent. above the June level; in the same period British wholesale prices rose only by one-fifth of 1 per cent., and fell slightly in October. When prices in the two countries got out of relation to each other the exchange was affected and gold moved as in the old days. Direct effects of exchange on prices cannot be found, nor does the burden, so called, of maintaining the gold standard appear to have been severe, for the Bank rate was reduced to 4½ per cent. on April 21st, when the Bank's stock of gold was £153,848,000, compared with £145,660,000 when the rate had been raised to 5 per cent. in December, 1925. The advances of the London Clearing Banks averaged £904,798,000 in December, 1926,

but in January, 1927, they rose to £913,197,000, about £6,000,000 being taken out of "Cash" (reducing the percentage of Cash to Deposits from 11·96 to 11·58), and £6,700,000 out of balances with other banks and cheques in course of collection. Advances increased to £925,711,000 in March, to £930,561,000 in June, and to £934,556,000 in July; in August, probably owing to holidays, there was a small reduction to £933,651,000, followed by a recovery to £935,048,000 in September. In August the percentage of Cash to Deposits was 11·44, and in September 11·49, percentages which indicate that the credit-creating powers of the banks were being somewhat strained. It is probable that a good proportion of the frozen credits included in Advances in December, 1926, had been liquidated in the course of the next six months, and the new loans which replaced them had a higher purchasing power in consequence of the fall in prices.

IV. *The Bank of England and the Money Market.*

Something requires to be said as to the operations of the Bank of England, since its concern to protect the official rate and maintain its gold reserve might easily have repercussions on the supply of bank credit available for trade. After the restoration of the gold standard there was naturally a period of some apprehension, and it is pleasant to find a recognition that the Bank is not always as cold-blooded as is usually represented. *The Economist* for May 16, 1925, recording that "there was a change in the state of the short loan market, relief having been given by semi-official purchases of June Treasury bills," added that "some surprise was expressed at the action of the authorities in relieving stringency, but, in view of the general tendency towards nervous exaggeration of the possibilities, there was something to be said for a little soothing medicine." In calming the market the Bank took a long view, for a little later it had to take control of the market in order to ensure provision for the normal autumnal requirements.

The normal function of the money market is the buying and selling of commercial bills, a function which it shares with the Bank of England and the joint stock banks. The funds of the market consist of the capital of the bill discounting and accepting houses, the deposits made with them by the public, their borrowings from the joint stock banks of "Money at Call or on Short Notice," their borrowings from the Bank of England, and the proceeds of re-discounting bills with the joint stock banks or the Bank of England. The market does not deal with the Bank of England unless forced to do so, as its terms are more onerous than those of the other banks. The flow of commercial bills is determined by the state of international trade. Compared with pre-war times, the situation is

complicated by the existence of a large mass of Treasury bills, which in 1925 averaged over £610 million, and required to be renewed at the rate of £30 million to £50 million a week. The money for these bills is mainly found from the bills paid off in the week, but the issues have to be arranged so that not only may the requirements of the Government be provided for and the three months' maturities met out of accruing revenue, but that also plenty of money may be available at the end of June and the end of December, when the market has to make large transfers of funds. The Government also has to make payments throughout the year on account of National Debt interest, especially on June 1st and December 1st for War Loan, and on these occasions and at the end of the calendar year has to borrow from the Bank of England. The distribution of interest eases the money market, but the collection of revenue in the last quarter of the financial year generally introduces stringency. Nevertheless, as *The Economist* said on June 6, 1925, "the skill with which these large interest payments are prepared for and handled usually makes their effect much less than the market anticipates."

The Bank of England is thus much preoccupied with Government finance, and the accommodation which it can afford to give to the money market must from time to time be governed by national requirements. The extent to which the market desires to have recourse to the Bank is, on the other hand, in part determined by the credit which it can get from the joint stock banks, and, although these banks always desire to have a proportion of their funds "at call or on short notice" as an immediately available reserve, they are usually prepared to reduce it if more profitable Advances can be made to the trading world. The money market must, however, always go to the Bank at the end of June and at the end of December. Their borrowings in the last week of June, 1924, were £14,263,000 above those of the previous week, and in the last week of June, 1925, the increase was £17,255,000: in the last week of December, 1924, about £20,010,000 more than in the previous week were borrowed, but in the last week of December, 1925, the increase was £23,484,000. In 1925, at least on these special occasions, the market was more dependent on the Bank than in the previous year.

The paucity of information accorded as to the day-to-day transactions of the Bank of England makes it difficult, and almost dangerous, to attempt any analysis of their published accounts for the purpose of determining their relations to the Government, to the money market, and to the other banks. Some consideration of the credit item "Other Securities" and of the debit item "Other Deposits" may, conceivably, prove not unfruitful. In "Other Securities" are included investments in securities other than Govern-

ment securities, bills discounted, and collateral pledged for loans. It thus includes both the borrowings of the money market and the borrowings of those private customers which it has just like any other bank.

"Other Deposits" includes (a) Bank Balances and (b) balances at the disposal of private depositors, bill discounters, "finance houses," etc., and the separate totals of these two categories are not disclosed. We do know, however, every month the weekly averages of "Cash in hand and at the Bank of England" for the London Clearing Banks, and it appears not unreasonable to assume that what is kept by them at the Bank bears a consistent relation to what is kept in the till, and that those two categories may be about equal in amount. As, taking the average of 1925, "Other Deposits" were equal to about 51 per cent. of the London banks' "Cash," it is plain that to estimate that Bank Balances included in "Other Deposits" are equal to about one-half of the recorded bank cash is to go to the ultimate limit. The Union of Smith's and London Bank was the only bank in London which in any recent pre-war year published the totals of its two kinds of Cash, and in the first half-year of 1908, for example, over 53 per cent. of the aggregate was in the Bank.

If we set off in the accounts of the Bank of England "Government Securities" against Capital, "Rest," and "Public Deposits," there will remain a balance of "Government Securities" and the total of notes, coin, and "Other Securities" to set against "Other Deposits" as split into Bank Balances and Private Deposits. This speculative division will be more clear from the following table giving average figures for March, 1925:—

| | £ mill. | £ mill. | £ mill. |
|---------------------|---------|-------------------------|------------------------------|
| Capital | 14.6 | { £32.4 million | { Government Securities 32.4 |
| Rest | 3.7 | | |
| Public Deposits ... | 14.1 | | |
| Other Deposits | 112.5 | { Bank Balances... 95.1 | { Cash 24.6 |
| | | { Private Deposits 17.4 | { Government Securities 8.6 |
| | | | { Other Securities ... 61.9 |
| | | | { Other Securities ... 17.4 |
| | 144.9 | | 144.9 |

Total Government Securities £41 million.

Total Other Securities £79.3 million.

Total Cash in hand and at Bank of England (London Clearing Banks) £190.2 million.

If balances with the Bank of England were only 40 per cent. of the cash of the London joint stock banks, "Private Deposits" would be raised to £36.4 million, and the distribution of "Other Securities" would be correspondingly affected.

The £61.9 million of "Other Securities" set in the table against Bank Balances represents the amount of money which the Bank of England was compelled to place at the disposal of the public by buying securities, discounting bills, or making advances, unless it was prepared to keep the funds of the joint stock banks idle as cash or invested in less profitable Government stocks. The balance of £17.4 million represents partly the original cash deposits of depositors and partly the deposit equivalent of bills discounted or loans made on securities on the initiative of discounters or borrowers, and to the extent to which it is composed of such loans or discounts it may perhaps be not unfairly described as representing credit created at the instance of the market. In that same month of March, 1925, the London Clearing Banks had a weekly average of £111.7 million of Money on Call or at Short Notice, so that the total funds placed at the disposal of the discount and other finance houses and the Stock Exchange by the London banks (Money at Call) and the Bank of England ("Other Securities") was £191 million.

It is obvious that the Bank of England can take money off the market by selling securities, and provide the market with funds by buying securities (*e.g.* "hot Treasuries" or Treasury bills approaching maturity) or discounting bills. By adopting either course according to circumstances the Bank can protect its rate, *e.g.* it will sell securities if the market rate of discount is too low and the Bank rate threatens to become ineffective, and funds tend to leave London for other international centres where they can be employed more profitably, and in this way it can lock up the superfluous funds. By reversing the process it can provide the market with funds—which is naturally the most welcome activity of "the hidden hand"—but it can only do so within limits. For by buying securities or opening credits against securities it increases the funds of the banks, and, therefore, their balances, for they do not desire to increase their "till money," and thus adds to its liabilities under "Other Deposits." The ratio of its Cash to its liabilities sinks, until a point is reached when, in order to avert a drain of gold in the transfer of unprofitable foreign balances, the Bank rate has to be raised. It is also plain that by reducing their Call Money the joint stock banks can "put the market in the Bank" if the market credit is to be maintained.

Whatever may be the true division of "Other Securities," their sum added to the "Money at Call or on Short Notice" of the London Clearing Banks constitutes the bank funds at the disposal of the London money market. A glance at Table II will at once show that, omitting the months affected by the "end of the year" and "end of the half-year" transactions, the market funds varied

considerably from month to month in 1924, but within a very narrow range in 1925. Indeed in the latter year, with the exception of February, when there was a heavy repayment of Exchequer Bonds, May, when the Clearing Banks inexplicably cut down their call money, and June and December, the market funds varied only within a range of 2 per cent. between maximum and minimum. In 1926 and 1927 the range was somewhat greater, but the tendency was to steadiness. One may conclude that it was the policy of the Bank of England to maintain market funds at a steady level, varying their own contribution inversely with that of the Clearing Banks. "Other Securities" fell from a monthly average of £75·3 million in 1924 to an average of £55·6 million in the first nine months of 1927, while "Money at Call" rose from an average of £105·3 million to an average of £132·9 million, an increase of £27·6 million against a reduction of £19·7 million. At the same time "Advances" made by the London Clearing Banks increased from an average of £808 million to an average of £927·5 million, or by £119·5 million. The policy of the Bank does not, therefore, seem to have impeded the supply of funds either to the market or to industry, though if they had supplied the missing £19·7 million, then, the demands of the money market remaining the same, the joint stock banks would have been able to make about £19·7 million more of advances to industry and trade. Banks, however, place their funds where they will bring most profits, and if in 1927 they were putting a relatively large amount at call or on short notice rather than using it as loans or overdrafts, it was because the former course was more advantageous to them than the latter. If advances had been greatly in demand, the banks would have reduced their call money and forced the market to go to the Bank of England for loans or re-discounts. That they did not do so shows that the necessary condition was not existent. It has to be remembered that advances originate not with the banks but with the borrowers, and if advances do not increase it shows that traders and manufacturers do not wish to borrow, or cannot provide the necessary security or pay the interest demanded. We cannot, therefore, accuse the Bank of England of keeping the money market short of funds in 1927 in order to keep the market rates from running away from the Bank rate, as they might have done had it been necessary to protect their rate and maintain the exchange.

V. *Mr. Keynes and the Gold Standard.*

Throughout the preceding argument wholesale prices in the United Kingdom have been compared with wholesale prices in the United States, in accordance with the classical view that (omitting

other than commercial transactions), the relative movement of wholesale prices in two countries governs in the long run the exchange value of their respective currencies. If equilibrium is disturbed by prices falling in the one country relative to prices in the other, the currency of the dearer country will fall relatively to that of the other, and the currents of trade will be diverted so that prices fall in the dearer country and rise in the cheaper until equilibrium is once more restored. The only prices which can produce this result are the prices of commodities which enter largely into international trade, that is to say, wholesale prices of products regularly quoted on the produce and metal exchanges, and of such finished goods as, for example, are dealt in on the Manchester and Birmingham exchanges. Such prices constitute by far the greater part of the components of the wholesale prices index-numbers compiled in the United Kingdom and the United States, and such index-numbers may properly be compared.

The cost of living index-numbers, on the other hand, which Mr. Keynes used in his *Economic Consequences of Mr. Churchill* as a basis on which to found an argument against the restoration of the gold standard, are built up out of retail prices and have no close time-relation to exchange movements. Retail prices, indeed, move slowly and irregularly behind wholesale prices, as anyone may see who takes the trouble to compare the "official" prices for flour in the London district with the "standard" prices for bread announced from time to time by the Associations of Master Bakers. Wholesale market quotations, on the other hand, are made while goods are in course of movement, and their changes immediately affect further transactions. Mr. Keynes, consequently, appears to be wrong in choosing his instrument of criticism. He, further, selected the Massachusetts cost of living figure instead of the Bureau of Labour figure, and, as Professor Gregory has shown (*The First Year of the Gold Standard*, pp. 50-51), during 1925, taking the Bureau index and the British cost of living index, "the two sets of figures, at the current rates of exchange, were at par." The Massachusetts index during the same period "gave an over-valuation of the pound of between 8-10 per cent.," and, as it was on this over-valuation that Mr. Keynes founded his criticism, his argument on this ground alone is open to serious challenge.

VI. *The Increase in the Cost of Living.*

Professor Gregory, combining the Ministry of Labour's cost of living index with Professor Bowley's wage index, concluded that "the net effect had been to increase real wages by 6 per cent. up to June, 1926," and added, "the conclusion that money wages are

still too high is inescapable" (*Op. cit.*, p. 59). Taking the average of the first nine months of 1927 the increase of real wages would appear to be over 8 per cent. This would, at first sight, appear to be a real cause of our export difficulties, though American experience has shown that the handicap (if such there be) of high wages can be overcome by efficiency of production. The Ministry of Labour, on the other hand, have stated that "at the end of 1925, weekly full-time rates of wages averaged between 1 and 2 per cent. higher than at the end of 1924, and about 75 per cent. higher than in August, 1914" (*Labour Gazette*, January, 1926, p. 4), and that "at the end of 1926, weekly full-time rates of wages were at about the same level, on the average, as at the end of 1925" (*Labour Gazette*, January, 1927, p. 3). The *Labour Gazette* for October, 1927 (p. 370), also records that in June and September weekly full-time rates of wages were from 70 to 75 per cent. above pre-war rates, thus showing a fall from the 75 per cent. increase which prevailed from early in 1925 till the first quarter of 1927. It would, therefore, appear that real wages at the beginning of 1925 were 97.2, taking the average of August, 1914, as 100, that for the average of 1925 they were 99.7, for the average of 1926 they were 101.6, and for the average of the first nine months of 1927 they were between 102.7 and 104.7. Further, the nine months of 1927 include the full period of the seasonal summer fall in prices and the winter rise is only just shown as beginning: part, at least, of the rise in real wages will disappear during the last three months of the year. It would, consequently, be hazardous to base any argument—any general argument, that is, apart from the effects on particular trades—on the slender statistical evidence provided by the Ministry of Labour as to an increase in real wages during 1926 and 1927, particularly since 1925 shows a loss. Professor Bowley's index, though formally more scientific than the Ministry's general average, has really a less solid foundation, for it is founded on the comparison with July, 1914, of only eleven rates of wages, for bricklayers and labourers, engineering fitters and labourers, composers, dock labourers, railwaymen, woollen-workers, cotton-workers, miners and agricultural labourers; further, the occurrence of the coal stoppage does not appear to have made any difference to his index-numbers. Professor Clay has recently (*Manchester Guardian Commercial*, 17th November, 1927) pointed out, in reply to those who allege high wages to be the cause of our industrial troubles, that, "with very few exceptions, in the industries in which wages to-day were more than 75 per cent. above the (pre-war) average, unemployment was less than 9.4 per cent., which was the average; and, conversely, in the industries in which wages were below the average, the unem-

ployment was greater than 9·4 per cent. Four-ninths of the unemployment in the last returns, representing altogether half a million of people, was in that group of industries—coal, engineering, shipbuilding, iron and steel, etc.—which could find employment for only four-thirteenthths of its insured population. This seemed in itself a sufficient proof of that maldistribution of labour which was at the root of the present trouble.” It must also be remembered that any diminution in the rates of wages tends in itself to diminish the total wage-bill, and, therefore, the extent of the home market, except in so far as any resultant absorption of the unemployed should produce an increase over the aggregate of the old wage-bill and unemployed pay together. The confident anticipation of such a result must always be problematical.

VII. *The Effects of the Return to Gold.*

We may now sum up the results of this historical investigation. The return to the gold standard produced a retarding effect on British trade, first through the anticipatory speculation which led to over-valuation of the £; secondly, by the raising of the Bank rate to 5 per cent.; thirdly, by the deflation of British prices consequent on the appreciation of the £ and the downward course of American prices; fourthly, by the embargo on foreign loans; and fifthly by the psychological effect on British industrialists of their over-estimation of the effects of the return to gold and of their undue fear of lower prices. The speculation in sterling, though injurious, was unavoidable; it had occurred in every country whose currency was appreciating, and it could only have been averted by an official announcement that the return to the gold standard would be postponed. Such a notice would have let loose a flood of bear speculation, and the £ would have depreciated with grave ultimate results, though export trade might have been stimulated temporarily in an unhealthy manner. The appreciation of the £ between the middle of 1924 and the beginning of 1925 may be solely attributed to speculation. The raising of the Bank rate in March was a shock to the Federation of British Industries, but 5 per cent. was a Bank rate which industry had often endured before and it was only in force for seven months; it affected traders directly more than manufacturers, as the former are more dependent on bank credit than the latter. The fall in British prices between January 1, 1925, and April, 1926 (the eve of the great industrial stoppage), was 16 per cent., but not the whole of this can be attributed to the return to gold. Over the same period United States prices fell 5·3 per cent., and, the exchange remaining the same, British prices would have had to fall correspondingly. The dollar value of sterling

appreciated by 1·8 per cent., which may, in the main, be regarded as an over-valuation of the £ due to speculation, anticipatory of the return to the gold standard, and as entailing a fall in British prices even if American prices had not moved. The inevitable fall in British prices arising from these two causes was much less than the actual reduction which took place, and was contributed to by "exchange dumping" in iron and steel, by over-production of coal, and by the weak position of some of our markets for finished goods. The differential fall in British prices compared with American prices necessarily caused the exchange, as the balancing instrument, to move in our favour. The real trouble was that the fall in prices was not distributed in equal degree over all commodities, but affected most severely those which were in a weak position. The fall in food-stuffs and raw materials produced lower prices in the corresponding manufactured commodities, but the sale markets for such goods were exposed to influences which did not operate in the large and protected home market of the United States. The chief of these were the over-production of coal on the Continent, the lower costs of manufacture on the Continent, and the "exchange dumping" practised by manufacturers in countries with depreciated currencies. All these factors, and especially the financial policy of Continental countries, were beyond British monetary control, and to them we owe it that British prices fell more rapidly than American, and that the brunt was borne by the unsheltered coal, iron, and steel trades, and in a lesser degree by the wool textile industry. Cotton had similarly suffered from the low-grade competition of India and Japan. The embargo on foreign loans endured for ten months in 1925, but it was still possible to subscribe abroad for foreign issues, and the actual result cannot be regarded as definitely determined.

For twelve months the United Kingdom was at an export disadvantage, and during the second and third quarters of 1925 the volume of exports of British goods was from 4 to 5 per cent. below that for the corresponding period of 1924, and, as indicated by retained imports of raw materials, the home market was also probably less. Then the tide began to turn in the fourth quarter, and in the first quarter of 1926 British exports were about 7 per cent. greater in volume than in the first quarter of 1924 and nearly up to the level of the first quarter of 1925. The gold standard had, in fact, several important advantages, the chief of which was the reduction of speculation in exchange. When two countries trading with each other have a fluctuating exchange as a result of disordered currencies, trade is reduced to a mere gamble in exchange. The restoration of the gold standard removed one hazardous element from our trade and enabled industry and trade

to develop in greater security. Other countries were also stimulated either to restore their currencies once more to a defined gold basis or, like France, to keep them in a (temporarily) stable relation to gold. Had our example failed, then the gambling element in trade would have been prolonged. With the restoration of the gold standard London returned to its place as the financial centre of Europe and, perhaps, of the world. Much financial business of a banking and commission nature came back to London, when otherwise it would have been located in New York, where the currency was stable. Countries with superfluous funds (like the United States) or with unsound currencies were more ready to place their capital for short terms in this country when they knew that its value would be invariable, and we once more began to compete with the United States as a long-term lender. We have made many overseas issues of considerable importance since April, 1925, which must have had a good effect on our export trade. Finally, from the tax-payers' point of view the increased value of sterling reduced the burden of the country's debt to America.

Industrialists, and Mr. McKenna, are too prone to assume that falling prices are bad for trade and rising prices a sign of health. Yet the fall in the level of wholesale prices since the beginning of 1925 had some good features. So far as it was caused by cheaper food-stuffs, it added to the real wages of the British working-classes, and so made for expansion of the home market; so far as raw materials became cheaper, our exporting capacity was strengthened. So far as traders and industrialists were dependent on bank accommodation, the appreciation of gold gave their loans thus obtained a greater purchasing power and enabled them to produce more cheaply. It is true, nevertheless, that the coal industry was only able to benefit in a very small degree from cheaper imports, and its particularly bad condition has coloured men's views of the condition of industry as a whole. The opinion that falling prices are bad for trade is contradicted by the experience of the United States over the past few years, when we have seen together falling prices, increased production, and rising wages. The truth is that, if prices fall slowly, if production is conducted with increasing economy, and if distribution is reorganized to meet the new development, low prices and prosperity can well go together. That is what we have seen in the United States, where every day production is more and more based on mechanical power, especially on electric energy, rather than on human power, and waste is eliminated by standardization of products and combination of producing units. There, too, distribution is now founded not on the anticipatory acquisition of stocks by retailers and merchants, with the

risk of gluts at various points in the distributory process, but on "hand-to-mouth buying," the responsibility for carrying stocks being thrown farther and farther back, on to merchants in the first line from the producer, and on to the producers themselves. An efficient railway system guarantees the prompt delivery of the goods required, stocks are reduced to the minimum, and production can be harmonized in anticipation, not of remote orders, but of regular orders which come along week by week. Economy in bank interest and in the avoidance of the locking-up of capital in large stocks also results. We thus find that production can be expanded at lower costs, permitting of lower prices, and with lessened dependence of business on banking. As a matter of fact the great expansion of credit in the United States has gone not to producers but to the stimulation of speculation in securities and real estate. The obvious moral for British producers and traders is to cease their laments over lower prices and their grumbling at the Bank of England and the Treasury, and to devote themselves to the reorganization of production and the re-scheming of distribution.

It has been suggested above that the detrimental effects of the restoration of the gold standard, such as they were, had worked themselves out by the autumn of 1925, and that during the next six months British trade and industry were distinctly on the up-grade. However that may be, it is certain that the seven-months stoppage of industry in 1926 has made it impossible to determine whether any residual effects can be discerned in the history of 1927. The disturbance was so far-reaching, the loss of markets so great, that all minor causes of loss have been overwhelmed in the mass effects of the stoppage. When industry was restored the working-off of accumulated orders obscured the real situation, but that phase appears to have exhausted itself by May, 1927. In the autumn there was a slight increase in unemployment, partly seasonal, but in the six months April to September, 1927, British exports were about 7 per cent. greater in volume than in the corresponding period of 1925, and 1.5 per cent. greater than in the corresponding period of 1924, while retained imports of raw materials were 16.4 per cent. greater in the second and third quarters of 1927 than in the second and third quarters of 1925. British wholesale prices have varied very little in average level for some months, the exchange dumping of France, Belgium, and Italy has ceased, and business on the whole appears to be in the way of revival. There seems to be no statistical reason for believing that current business is now suffering from the restoration of the gold standard, and the present perplexities as to the effects on prices of variations in the future supply of gold are outside the range of the present discussion.

TABLE I.

Monthly Position of London Clearing Banks (Weekly Averages in £ million).

| Period. | Cash in hand and at Bank of England. | Balances with other banks and cheques in collection. | Money at Call and on Short Notice. | Bills Discounted. | Investments (general). | Advances. | Deposits. | Ratio of Cash to Deposits. |
|-------------|--------------------------------------|--|------------------------------------|-------------------|------------------------|-----------|-----------|----------------------------|
| 1923. | | | | | | | | |
| Dec. 31 ... | 224.7 | 60.8 | 106.8 | 267.4 | 358.0 | 778.9 | 1725.3 | |
| 1924. | | | | | | | | |
| Jan. ... | 199.8 | 46.1 | 104.0 | 295.4 | 363.2 | 777.7 | 1715.0 | 11.65 |
| Feb. ... | 192.8 | 45.3 | 96.3 | 264.3 | 358.3 | 787.2 | 1673.9 | 11.52 |
| March ... | 189.2 | 45.1 | 97.1 | 226.8 | 353.4 | 802.4 | 1642.8 | 11.51 |
| April ... | 191.5 | 49.3 | 101.4 | 227.4 | 348.9 | 807.4 | 1654.6 | 11.58 |
| May ... | 190.5 | 46.5 | 104.4 | 238.1 | 344.2 | 803.0 | 1637.5 | 11.49 |
| June ... | 201.4 | 52.0 | 111.6 | 247.7 | 341.1 | 808.3 | 1691.6 | 11.91 |
| June 30 ... | 214.4 | 60.7 | 108.2 | 232.2 | 339.4 | 818.4 | 1702.9 | |
| July ... | 193.0 | 47.8 | 101.8 | 262.0 | 340.1 | 808.2 | 1682.4 | 11.48 |
| Aug. ... | 191.5 | 46.7 | 104.9 | 237.2 | 338.1 | 808.6 | 1656.4 | 11.56 |
| Sept. ... | 193.0 | 46.6 | 111.4 | 228.1 | 331.9 | 811.4 | 1631.8 | 11.68 |
| Oct. ... | 192.9 | 51.8 | 107.2 | 240.4 | 328.4 | 823.9 | 1674.0 | 11.52 |
| Nov. ... | 192.8 | 49.9 | 105.7 | 237.2 | 324.7 | 827.6 | 1667.4 | 11.56 |
| Dec. ... | 209.0 | 55.2 | 117.4 | 237.3 | 320.6 | 827.7 | 1696.6 | 12.32 |
| Dec. 31 ... | 228.3 | 65.2 | 119.0 | 219.2 | 317.4 | 836.0 | 1707.5 | |
| 1925. | | | | | | | | |
| Jan. ... | 199.9 | 51.8 | 116.2 | 248.0 | 313.4 | 834.8 | 1693.1 | 11.81 |
| Feb. ... | 198.5 | 51.6 | 125.0 | 236.7 | 304.6 | 837.5 | 1683.0 | 11.79 |
| March ... | 190.2 | 51.1 | 111.7 | 205.1 | 299.4 | 857.1 | 1643.5 | 11.57 |
| April ... | 193.0 | 54.5 | 115.9 | 193.6 | 294.6 | 864.2 | 1644.8 | 11.74 |
| May ... | 189.2 | 51.1 | 107.9 | 202.8 | 291.1 | 865.2 | 1636.4 | 11.55 |
| June ... | 201.9 | 56.0 | 116.7 | 208.2 | 283.5 | 867.0 | 1662.8 | 12.14 |
| June 30 ... | 214.3 | 64.5 | 117.9 | 214.1 | 265.5 | 877.8 | 1683.9 | |
| July ... | 197.5 | 50.5 | 118.0 | 231.2 | 276.7 | 867.7 | 1671.3 | 11.81 |
| Aug. ... | 196.2 | 47.8 | 120.8 | 226.3 | 272.5 | 855.7 | 1648.8 | 11.90 |
| Sept. ... | 194.9 | 46.3 | 114.9 | 242.9 | 271.3 | 850.8 | 1650.6 | 11.87 |
| Oct. ... | 192.6 | 47.7 | 116.7 | 247.4 | 275.8 | 854.1 | 1664.9 | 11.57 |
| Nov. ... | 191.3 | 51.6 | 115.4 | 237.9 | 277.2 | 853.4 | 1656.3 | 11.55 |
| Dec. ... | 203.2 | 57.1 | 121.9 | 233.7 | 277.0 | 863.2 | 1684.3 | 12.06 |
| Dec. 31 ... | 221.7 | 65.4 | 125.6 | 204.7 | 276.1 | 880.7 | 1700.9 | |
| 1926. | | | | | | | | |
| Jan. ... | 195.9 | 49.8 | 117.6 | 233.5 | 277.9 | 873.5 | 1675.0 | 11.69 |
| Feb. ... | 190.8 | 48.3 | 114.5 | 212.4 | 270.8 | 879.8 | 1643.5 | 11.61 |
| March ... | 189.7 | 50.5 | 113.8 | 189.9 | 263.0 | 892.3 | 1624.7 | 11.67 |
| April ... | 190.0 | 50.3 | 120.8 | 190.1 | 260.9 | 890.1 | 1627.5 | 11.67 |
| May ... | 190.8 | 52.4 | 117.1 | 188.3 | 259.6 | 893.3 | 1626.9 | 11.73 |
| June ... | 201.9 | 53.0 | 125.7 | 213.0 | 258.8 | 889.3 | 1667.5 | 12.12 |
| June 30 ... | 216.1 | 58.5 | 121.4 | 206.9 | 258.3 | 899.9 | 1687.3 | |
| July ... | 197.8 | 49.7 | 122.7 | 235.6 | 261.8 | 890.1 | 1683.6 | 11.76 |
| Aug. ... | 196.4 | 47.4 | 121.4 | 228.6 | 262.9 | 888.0 | 1670.8 | 11.73 |
| Sept. ... | 193.7 | 45.2 | 117.1 | 220.7 | 263.6 | 893.8 | 1660.1 | 11.69 |
| Oct. ... | 196.0 | 49.4 | 120.1 | 227.1 | 265.6 | 901.4 | 1683.9 | 11.63 |
| Nov. ... | 194.8 | 49.7 | 121.8 | 222.2 | 267.2 | 903.1 | 1685.1 | 11.63 |
| Dec. ... | 206.4 | 55.6 | 132.8 | 233.3 | 266.1 | 904.8 | 1725.6 | 11.96 |
| Dec. 31 ... | 223.1 | 66.8 | 127.3 | 215.8 | 266.4 | 925.5 | 1750.1 | |
| 1927. | | | | | | | | |
| Jan. ... | 200.4 | 48.9 | 129.4 | 246.3 | 267.4 | 913.2 | 1730.8 | 11.58 |
| Feb. ... | 194.8 | 49.4 | 121.8 | 222.2 | 258.8 | 917.6 | 1689.7 | 11.53 |
| March ... | 191.9 | 49.6 | 123.4 | 198.5 | 255.0 | 925.7 | 1669.3 | 11.49 |
| April ... | 195.7 | 51.1 | 128.4 | 198.7 | 251.8 | 928.0 | 1679.1 | 11.65 |
| May ... | 195.0 | 54.5 | 131.3 | 199.6 | 252.2 | 929.0 | 1687.0 | 11.55 |
| June ... | 203.0 | 56.4 | 144.2 | 209.7 | 252.3 | 930.6 | 1721.9 | 11.79 |
| June 30 ... | 220.7 | 66.5 | 144.9 | 189.2 | 252.1 | 948.8 | 1748.1 | |
| July ... | 197.2 | 52.5 | 137.5 | 218.7 | 253.1 | 934.6 | 1719.2 | 11.47 |
| Aug. ... | 195.1 | 50.9 | 141.8 | 207.1 | 252.0 | 933.7 | 1705.9 | 11.43 |
| Sept. ... | 195.9 | 46.9 | 138.7 | 213.4 | 249.4 | 935.0 | 1704.8 | 11.49 |

TABLE II.

Money Market Credit (Monthly Averages in £ million).

| Period. | Bank of England, Other Securi- ties. | London Clearing Banks, Money at Call. | Total. | Period. | Bank of England, Other Securi- ties. | London Clearing Banks, Money at Call. | Total. |
|-------------|--|---|--------|-------------|--|---|--------|
| 1924. | | | | 1926. | | | |
| Jan. ... | 72.0 | 104.0 | 176.0 | Jan. ... | 79.9 | 117.6 | 197.3 |
| Feb. ... | 70.1 | 96.3 | 166.4 | Feb. ... | 77.7 | 114.5 | 192.2 |
| March ... | 74.8 | 97.1 | 171.9 | March ... | 77.9 | 113.8 | 191.7 |
| April ... | 74.9 | 101.4 | 176.3 | April ... | 67.7 | 120.8 | 188.5 |
| May ... | 72.9 | 104.4 | 177.3 | May ... | 71.4 | 117.1 | 188.5 |
| June ... | 77.5 | 111.6 | 189.1 | June ... | 76.3 | 125.7 | 202.0 |
| June 30 ... | 95.4 | 108.2 | 203.6 | June 30 ... | 103.1 | 121.4 | 224.5 |
| July ... | 72.3 | 101.8 | 174.1 | July ... | 71.5 | 122.7 | 194.2 |
| Aug. ... | 77.2 | 104.9 | 182.1 | Aug. ... | 71.4 | 121.4 | 192.8 |
| Sept. ... | 77.1 | 111.4 | 188.5 | Sept. ... | 70.0 | 117.1 | 187.1 |
| Oct. ... | 76.5 | 107.2 | 183.7 | Oct. ... | 71.6 | 120.1 | 191.7 |
| Nov. ... | 77.4 | 105.7 | 183.1 | Nov. ... | 70.9 | 121.8 | 192.7 |
| Dec. ... | 81.0 | 117.4 | 198.4 | Dec. ... | 79.5 | 132.8 | 212.3 |
| Dec. 31 ... | 103.6 | 119.0 | 222.6 | Dec. 31 ... | 96.7 | 127.3 | 224.0 |
| 1925. | | | | 1927. | | | |
| Jan. ... | 74.8 | 116.2 | 191.0 | Jan. ... | 80.6 | 129.4 | 210.0 |
| Feb. ... | 74.1 | 125.0 | 199.1 | Feb. ... | 73.6 | 121.8 | 195.4 |
| March ... | 79.4 | 111.7 | 191.1 | March ... | 77.3 | 123.4 | 200.7 |
| April ... | 75.7 | 115.9 | 191.6 | April ... | 65.8 | 128.4 | 194.2 |
| May ... | 74.6 | 107.9 | 182.5 | May ... | 48.8 | 131.3 | 180.1 |
| June ... | 78.0 | 116.7 | 194.7 | June ... | 50.6 | 144.2 | 194.8 |
| June 30 ... | 96.4 | 117.9 | 214.3 | June 30 ... | 59.5 | 144.9 | 204.4 |
| July ... | 70.7 | 118.0 | 198.7 | July ... | 51.1 | 137.5 | 188.6 |
| Aug. ... | 70.3 | 120.8 | 191.1 | Aug. ... | 47.1 | 141.8 | 188.9 |
| Sept. ... | 73.7 | 114.9 | 188.6 | Sept. ... | 46.8 | 138.7 | 185.5 |
| Oct. ... | 71.4 | 116.7 | 188.1 | | | | |
| Nov. ... | 74.3 | 115.4 | 189.7 | | | | |
| Dec. ... | 83.0 | 121.9 | 204.9 | | | | |
| Dec. 31 ... | 103.2 | 125.6 | 228.8 | | | | |

DISCUSSION ON MR. MACROSTY'S PAPER.

MR. R. G. HAWTREY : It is a great pleasure to me to propose a vote of thanks to Mr. Macrosty. The Society has reason to thank him, first of all because his has been a very good paper; secondly, because it was full of statistical material; thirdly, because it was full of highly disputable propositions; and fourthly, because I feel sure Mr. Macrosty will put up a very good fight for each one of the disputable propositions if, in fact, it is disputed.

The paper covers so much ground that it is rather difficult to make an opening speech upon it. Mr. Macrosty's method is to defend the operation of the gold standard, primarily by finding separate explanations of the different injurious effects that might in one way or another have been attributed to it. That is a difficult method both to apply and to criticize. There do emerge a certain number of general propositions which I will deal with first, and if there is time later on, I will mention some details that strike me as requiring criticism.

In the first place, Mr. Macrosty quite rightly bases his paper throughout on the principle of purchasing power parity. He compares price levels in this and other countries, and examines exchange movements from that standpoint. Naturally, among the comparisons the predominant one is with the United States. Mr. Macrosty's references to the United States are sometimes in a summary form which I find difficult to reconcile with the facts. He leads off with the statement that without any assistance from bank rate policy, business in the United States began to revive in the second half of 1921. He omits to mention that the rediscount rate in New York was reduced from 7 per cent. in May to $4\frac{1}{2}$ per cent. in November and 4 per cent. in the following June. It is a matter of opinion whether that had any effect on the state of trade, but at any rate it ought to have been mentioned, and if Mr. Macrosty thought it did not have any effect, he might have expressed that opinion.

He passes on to a further statement about trade in the United States in the following years up to the beginning of 1923, and points out that after that period prices continued to fall in the United States, and he says that "improving trade and a better organization of industry cheapened finished goods." Is that really a tenable position? The fall of prices began in April, 1923. In May, 1923, the index-number of manufacturing production was 107. In December, 1923 it had fallen to 96 per cent., and in July, 1924 to 82. Where is the improving trade by which Mr. Macrosty accounts for the fall in prices of finished goods? I think that possibly something a little more elaborate, not only about trade and prices in the United States, but about monetary policy in the United States, would have added greatly to the value of the paper. I do not wish to suggest that his general conclusions would have been altered, but what would have been altered is his statement at the end that "the opinion that falling prices are bad for trade is contradicted by the experience of the United States over the past few years, when we have seen together

falling prices, increased production and rising wages." There have been two periods of falling prices in the United States, the one to which I have just referred in 1923 and 1924, when output fell by nearly 25 per cent., and the other in the last two or three years. A good deal of stress has been laid in the paper on the fall of prices in America since 1925, but there again, though there has been no such striking fall in productive activity as in 1923 and 1924, their index of production has been practically stationary. The indexes in recent years have been :—

105 in 1925,
107 in 1926,
106 in 1927,

and lately it has been a bit lower. There has been a definite set-back in the trade of the United States. This illustrates and confirms the generally accepted view that falling prices mean bad trade.

Mr. Macrosty quotes a passage from the *Economist* written in the middle of 1925, in which that general principle is disputed, on the ground that the cost of temporary borrowing is an insignificant fraction of the cost of production in an industrial concern. I cannot help thinking that that passage was both stated hastily by the *Economist* and quoted hastily by Mr. Macrosty. It is not the industrialist who responds immediately to money market conditions; it is the dealer, whether in goods or stock exchange securities. The dealer is extremely sensitive to money market conditions, and even the industrialist, when he combines dealing on a considerable scale with his other activities, becomes sensitive too. Mr. Macrosty did certainly add to that quotation the opinion that the psychological influence must also be allowed for. I am not sure that the whole theory of the effect of bank rate upon the state of trade could not be called psychological. Certainly the psychological factor is very important: the purpose of the high bank rate is to affect the motives of traders and banks; it affects the motives of traders by making them reluctant to borrow, and those of bankers by making them reluctant to lend. The reluctance of the bankers to lend does enormously reinforce the immediate effect of the increased cost of borrowing.

On the general question of policy I do not for a moment differ from what Mr. Macrosty has said about the justification for returning to the gold standard. I do not believe that it was possible to abandon the gold standard, especially when numerous countries all over the world were in course of returning to it. If gold is an international currency, it must be the currency of London, which is *par excellence* the international centre.

I think Mr. Macrosty ought to have given a little further consideration to alternative gold standard policies. I do not mean necessarily to recommend any of them myself, but merely to say as a criticism of the paper that I think they ought to have been dealt with. There are two particularly which call for mention: one is the alternative of de-valuation; it might have been possible to stabilize the pound at \$4.50 instead of \$4.86. The other alternative is the

policy of *de facto* stabilization. Instead of forthwith granting a general licence and legalizing parity, there was the alternative of making sterling convertible administratively—selling gold, but maintaining the right to suspend sales of gold if any serious difficulty should arise. The policy of *de facto* stabilization has been adopted by many countries like France, Belgium and Germany, and others that have de-valued their currency. It was adopted by Canada with her former parity, and by India, on re-establishing parity higher than the old one, and before the war I think there were many cases of *de facto* stabilization. That is an alternative that might well have been considered in the paper.

There are one or two points of detail to which I should like to refer.

On p. 307 Mr. Macrosty expresses an opinion about frozen loans : that these differ from new advances in that only new advances increase purchasing power. I think there is a certain amount of misunderstanding about frozen loans. What are really frozen are not the loans but the deposits—the balances. If only people would spend their deposits the loans would very quickly thaw. Therefore that distinction between frozen loans and other loans seems to me to be rather misleading. The root of the matter is to be found in the velocity of circulation. At a time of falling prices velocity is low.

On p. 309 Mr. Macrosty makes a comparison of the British index-number of cotton and cotton goods, with the price of middling American cotton. Has he not forgotten that our index-number in this country includes Egyptian cotton, which had fallen much more heavily than the American and I should not be at all surprised to find that finished goods fell less, and not more, than the raw cotton, although I have not examined the figures.*

Further down on that page there is a discussion on internal and external French prices. I only refer to that because it seems to me that Mr. Macrosty has omitted a factor in the relation between pre- and post-war tariffs. Nearly all the European index-numbers are materially affected by this, and the same applies to the United States. On the same page I think that the accumulation of stocks of coal at the end of 1925 and beginning of 1926 in Germany and Poland may be attributed perhaps as much to our coal subsidy as to anything that can be called over-production on the Continent. I do not think the production of coal in Germany at that period was as great as subsequently. I would like to refer to one other point, the statistics given by Mr. Macrosty for the Bank of England. It is a most ingenious effort to get behind the screen of secrecy, but I am afraid it has not been—so far as I can see—altogether successful. I am not so much referring to the composition of the Bank of England balance sheet as to Table II, where Mr. Macrosty tries to arrive at a measure of Money Market Credit. He adds the "Other Securities" in the Bank of England to the call loans of the banks. Now if it were true that the accommodation given by the Bank of England to the money market were exclusively under "Other Securities" and the money of the joint stock banks were lent exclusively to discount

* The passage referred to has now been revised.—Ed.

houses, his figures would be significant. But neither of these propositions is true. The dealings of the Bank of England may just as easily be with Government securities and Treasury bills, and the subdivision has no special significance for Mr. Macrosty's purpose. Mr. Macrosty himself points out that call loans of the London Clearing Banks include loans to the Stock Exchange as well as funds at the disposal of the London money market.

There is an application of Mr. Macrosty's calculations to which I must take exception. He comes to the conclusion that the Bank of England did not peg the discount rate in the latter part of 1927. If Mr. Macrosty will look at the actual figures of the discount rate, he will find that it practically ceased to move, and remained $\frac{3}{16}$ below bank rate from about May or June until the end of December 1927. The evidence of the discount rate being pegged is indisputable, and Mr. Macrosty's figures do not destroy the presumption that it was so.

I have great pleasure in moving a Vote of Thanks to Mr. Macrosty for his admirable paper.

PROFESSOR GREGORY seconded the Vote of Thanks. (We regret that, owing to the absence of Professor Gregory in America and the inadvertent destruction of the original shorthand notes, we are unable to reproduce his observations.)

MR. NORMAN CRUMP said he had not intended to intervene at this early hour, partly because he had hoped to collect some more of the ammunition that had been hurled at Mr. Macrosty, and to fire it back on his behalf. So far he had only collected one minor shell which he would like to return to Mr. Hawtrey.

Mr. Hawtrey had referred to the possibilities of *de facto* stabilization. Mr. Crump would like to suggest to him that that was really ruled out of account by the fact that the relevant Act expired in 1925, the year in which the return to gold standard was made. If the question had arisen of enforcing a period of *de facto* stabilization, it would have meant an extension of the Act, and he agreed with Professor Gregory that the psychological result might have been worse, though in a different way. Had it not been for that purely legislative fact, Mr. Crump agreed that Mr. Hawtrey had made out a case. As it was, he suggested to Mr. Macrosty that that was the easiest way of disposing of it.

Mr. Crump thought it was a secret shared by everyone that, as Mr. Macrosty had said, while the net gain from the return to gold might have been considerable at the time it was done, it meant taking rather a nasty dose of physic, and he thought the task Mr. Macrosty had performed, in his usual admirable way, was to analyse that dose of physic and discover the particular ingredients of which it was composed.

One point Mr. Crump wished to put. Mr. Macrosty had hinted from time to time that the changes in the general price level were

caused by this factor in corn and oil or that factor in cotton, and so on. Mr. Crump thought that this was the wrong way to go to work; he would prefer to put it in the following way: that individual price movements did not cause a change in the general price level; they were in part the result of such a change, and in part the result of particular factors affecting each particular commodity. A fall in the general price level could express itself by a fall in cotton, steel or coal, but Mr. Crump was not satisfied that the reverse applied, and he thought that to say that the fall in any month in the general price level was caused by a fall in cotton or in steel was to speak loosely and possibly misleadingly.

Referring to what happened in 1925, Mr. Crump said that he looked at it in the following way. There was a slight fall in the tide of the general price level. He thought it would be agreed that there was a slight fall in the United States in 1925, but there was a larger fall over here, and it was this that was due to the return to gold. Referring to the fall in the United States, Mr. Crump said that when he was over there in the autumn of 1925, it was at the most interesting stage of its history, and he said to them, "It is hard luck upon us that your price level happened to fall at a time when we returned to gold," and they threw it back at him that the British return to gold was one of the factors that caused the fall in the American price level. Mr. Crump said he did not accept or reject that theory, but he thought that on the whole he would be inclined to reject it: at the time, he said to the Americans, "You have not only given us the wound, but now you are turning the knife in it." In England as he had said, there was a slightly bigger fall in the tide, because it was necessary to catch up. That fall had a good and a bad side. The good side was that it calmed down a lot of the whirlpools. The bad side was that it had left outstanding one or two rocks, and, at the risk of introducing a political topic, he would say that one of the largest of these was the present burden of taxation, which, either by accident or design, Mr. Macrosty had allowed to escape his notice. At the risk of introducing another political topic, he would say that at the time of the return to gold, the powers that be aggravated our difficulties by adding a few more layers on the top of this last rock. He admitted he was getting controversial but could not help it, because Mr. Macrosty had given him such a heap of political ammunition in his paper.

Mr. Macrosty alluded to the fact that the coal stoppage meant that in 1926 the nation had more supplies to buy and less goods to buy them with, and went on to say that "whereas in 1925 we exported on balance £8,214,000 of gold coin and bullion, we imported on balance £11,398,000 in 1926." Those two statements put side by side were rather contradictory to what one would expect, but no doubt Mr. Macrosty had a good explanation to offer.

Mr. Crump said, in conclusion, that this was not the only paper Mr. Macrosty had presented to the Society, and he hoped it would not be the last. When the time came—in some ten or fifteen years—that a connected history of this post-war period could be written, it would

be found that Mr. Macrosty had given to this Society, and through the Society to the world, a connected series of historical papers giving evidence year by year, and month by month, which would be of the utmost value to the historian of the future. The full value of Mr. Macrosty's work was probably not realized; to some extent that would be left to posterity, but he personally appreciated its lasting value very fully.

MR. PERCY WALLIS said he would like to refer to one or two points in Mr. Macrosty's paper which appeared to show some slight misunderstanding of the gold standard. Mr. Macrosty suggested that there had been no alteration in the trade position in the period under review in the United States. Before coming to the meeting Mr. Wallis was examining the U.S.A. Labour Bureau Report, in which it was shown that employment in January of this year was 11 per cent. less than in 1924.

An important point was also raised in referring to the state of trade in the United States. Mr. Macrosty suggested that with "increasing economy" they had been able to maintain business. Surely "increasing economy" had nothing to do with the price level, which was subject to the influence of the gold standard. Changes in the price per unit caused by economy in production or a change in the cost of production must be independent of the change in the price level caused by alteration in the gold standard. The British index-number unfortunately did not show the correct gold standard movement, because the changes in cost of production were not taken into consideration. This point was very definitely shown by the cotton index-number. In calculating the cotton-index referred to by Mr. Macrosty, the price per pound was taken as an indication of the changes in the gold standard. In the period under review, the American cotton crop had varied in cost of production from 130 pounds an acre to 180 pounds. As a measure of the changes in the gold standard, the cotton index-number gave this very great discrepancy.

Mr. Macrosty further suggested that trade did not always follow the movement of prices. This view was based on an examination of prices without making any allowance for the change in cost of production. Trade always followed the movement of the gold standard, but this was shown by the total sum produced and not by the price per unit. In illustration of this point, Mr. Wallis said that a few days ago, when examining the boot and shoe trade figures, he found that although the rate of wages had changed in the period under review from 68s. to 56s., the actual highest earnings per year had been at the 56s. rate. Throughout the whole of this period the actual annual earnings had been £112 per person employed, except in 1927, when it rose to £116. This fact ought to be taken into consideration when dealing with price level. From an industrialist's point of view, the total wages, not the rate, are the important factor when examining his trading account at the end of the year. The total wages compared with the total selling price is the factor on which trade improvement rests. It appeared to Mr. Wallis that the gold standard had ruled the

total wages irrespective of any alteration in the rate per week. The rate in the shoe trade was fixed on the basis of the cost-of-living index, which measured unit prices and not the gold standard. This price index had changed owing to cost of production changes, but the actual earnings had not moved because the gold standard had not altered.

Mr. Wallis said he had much pleasure in supporting the resolution of a vote of thanks to Mr. Macrosty for his excellent paper.

MR. MACROSTY, replying, said: Mr. Hawtrey has complained that I passed too lightly over the history of the early post-war years. He forgets that I dealt with that period in detail in my previous paper, which covered the years 1919 to 1923 inclusive. It is with the latter date that my present paper really begins, and I only introduced a few sentences relating to the previous period in order to link on to the old paper for the convenience of anyone who might want to read the two together. For the same reason I must refuse to answer Professor Gregory's remarks about the deflation policy of 1921. I should have had great pleasure in crossing swords with him on that subject if he had come to hear that paper and fought it out with me then, but past fights are past fights.

Mr. Hawtrey proposed to me a series of alternative methods of dealing with the return to gold standard, and thought my paper would have been improved if I had dealt with them, but as usual he carefully avoided telling us which he thought was the best. Professor Gregory and Mr. Crump completely and effectively dealt with one of the methods—*de facto* stabilization—and as to the third—*de-valuation*—if there is anything which would have been certain to upset our whole monetary situation and destroy the whole of our credit in all senses of the term, it would have been that policy of rewriting the pound at a lower value. That the British pound should no longer go round the world on its own old value is the one thing that would have tended to produce something like ruin in this country.

I do not understand the point Mr. Hawtrey made as to the supposed distinction between frozen loans and frozen deposits. I was talking in the language of the banker, and when it comes to a matter of explaining what his accounts are, what he understands by them and what they mean to him, then, with all due deference, I prefer to use the language of the practical man who is dealing with these matters.

A question was raised with regard to the Bank of England policy and discount rate from the spring of last year. I really would much have preferred to have stopped what I had to say round about the spring of 1927, because from that period there were a number of factors which came into operation which had little or nothing to do with the restoration of the gold standard, such as the French policy with regard to gold, which had a very serious effect upon the whole monetary situation both in this country and in America. My only object in going on as far as I did was to see whether any traceable effects of the return to the gold standard in the spring of 1925 had

ceased to operate by the spring of 1927 or whether they continued to a later date. For obvious official reasons both Mr. Hawtrey and I are not in a position to write a full criticism of the financial events of last year.

I really cannot find any fault with what Professor Gregory said as to the position of the Bank of England. If I seemed to suggest that the Bank of England throughout the whole period from 1924 to the spring of 1927 had a definite policy which they carried out undeviatingly throughout that period, I managed to give a wrong impression. If you refer to my previous paper, the point I tried to make was that the Bank of England did not have an undeviating policy, but that up to and since 1923 it founded its policy on certain principles, and accommodated that policy to the requirements of the day. That is the nearest one can get, and all I attempted to extract from it was that whatever other policies the Bank of England might have had, one effect of their policy was—and if I am not mistaken Professor Gregory himself on another occasion made exactly this same point—that the Bank of England was achieving as a result of this policy a certain stabilization of the amount of market credit from 1925 up to the middle of 1927. I do not think that his criticism of me on that point was really of a particularly severe character.

I must repeat that I think there was a good deal more of the truth in what Professor Clay said about the labour situation than in what Professor Gregory said. I think Professor Gregory expressed a definite opinion on evidence too slender to bear the conclusion he built on it, for, unfortunately, one must confess that the statistics of wages since the war are extraordinarily imperfect.

With regard to Mr. Crump's remarks, I think that when he was talking about price levels he was not expressing any real distinction between himself and myself: it was largely a question of words. What I want to get at is this, that on the monetary side you have a force which tends to act evenly upon all commodities, but all commodities are not equally situated and are subject to a large number of other forces. In regard to each particular commodity a relative movement is compounded out of the movements of all these forces, and from the relative movements of all commodities there is derived a resultant movement and a statistical construction which is called the average price movement.

Mr. Crump said he could not understand my statement of the position in 1926, where I said we had more supplies to buy and less goods to buy them with, when at the same time we imported more gold in 1926. Precisely; the gold was one of the goods we had to buy in 1926, we bought more gold and other goods, and we had less material goods and services to buy them with, and consequently the Board of Trade in estimating the balance of trade for 1926 showed a deficit for that year.

I thank you all, and particularly the speakers, for the very generous way in which you have listened to and treated my paper. We cannot attempt to write the full history now, but we must try to get more snapshots of it before all the facts disappear.

As a result of the ballot taken during the meeting, the candidates named below were elected Fellows of the Society :—

Robert Carson, A.L.A.A.
William Howard Davies, B Com.,
F.C.W.A.
Eric Lyde Hargeaves.
Hubert Richmond Kemp.
James Henry Lloyd.

Edward Adrian Lumley.
Reginald William Anthony
Quinton.
Walter W. Stewart.
Owen Ernest Woodward.

VITAL REGISTRATION IN EUROPE.

THE DEVELOPMENT OF OFFICIAL STATISTICS AND SOME DIFFERENCES
IN PRACTICE.

By MAJOR P. GRANVILLE EDGE, O.B.E.

[Read before the Royal Statistical Society, April 17, 1928,
DR. J. BONAR, Vice-President, in the Chair.]

DURING the past four or five years I have had occasion to make a study of the various statistical systems in use in the principal European countries. In the course of this work it has been my privilege to visit the Central Statistical Offices of the capital cities of these countries, where I have had access to statistical literature not ordinarily available in official published reports, and have been further enabled to discuss with responsible officials in each country the methods of classification and tabulation adopted to meet national needs. It may, therefore, be not without interest to endeavour to summarize briefly some of the results of these enquiries: to try to give a short account of the development of official statistics in various European countries, and to call attention to some of the existing differences in continental practice.

In making this endeavour, it has seemed to me that the work falls naturally into two main divisions, the first having the task of describing population questions, and the establishment of the principle of regular census enumerations in various countries; the second, the development of vital registration, and the systems which are peculiar to the various nations concerned; I therefore propose to arrange my observations under these two headings:

1. *Estimates of Population, and Census-Taking.*

Ancient history is rich in its references to the practice of numbering the people. Frequent enumerations of the Israelites are mentioned in the Old Testament: the histories of Persia, China, and Egypt, record early enumerations of their populations, while four or five centuries before the birth of Christ, census-taking at quinquennial intervals had been definitely established in Rome. In view, therefore, of the evident antiquity of the operation, it may seem strange that even during the Middle Ages, there was nothing in Europe which

resembled, even remotely, the carefully defined organization appointed for the enumeration of the Romans every five years. Yet, in fact, it is not altogether surprising that regular census-taking was neglected, for it is an operation which can only be effectively carried out under stable and strongly organized government authority; it is hardly too much to say that, during the Middle Ages, such authority was non-existent in many of the European States. Irregular enquiries were certainly instituted, since public necessity, even in those days, demanded some knowledge of the number of selected classes of the population, but since such enquiries were invariably designed for military or taxation purposes, and did not apply to the whole population, they were, therefore, not census enumerations in the modern sense, but merely registers of taxpayers, or rolls of men eligible for military service: such records, nevertheless, are of considerable scientific interest and importance. Of this class of population record we may cite the Domesday Book begun by the Norman Conqueror; the Poll Tax Returns of the fourteenth century in England; the Dutch Tax Registers of the fourteenth century; the *État des Subsides* of 1328, enumerating the numbers of *feux* or hearths in the territories of Philip VI of France; the *Dénombrement de la Prévosté et Chastellanie de Pontoise* made in 1332, in order to ascertain the dowry of Queen Jeanne; the enumerations made for purposes of administration in certain German cities during the Middle Ages; and, at the end of the seventeenth century, the French records of the *Intendants des Provinces*. Such efforts as these were made in other European countries at irregular intervals from early times, but, as these operations were occasionally limited to particular areas within a district or country, and the population for the whole district or country estimated from such results as were obtained, they cannot be considered as reliable estimates of the population of a country as a whole.

The limited objects of these early *ad hoc* enquiries were perhaps calculated to produce somewhat inaccurate results, for otherwise it is difficult to explain the formidable variations noticeable between one enquiry and the next in the same country. It is not altogether unfair to assume that an enquiry designed to produce lists of persons liable to taxation of a particular kind, or to military service, might induce a certain section of the population, liable under the terms of the enquiry to be enumerated, to absent themselves purposely from their local areas during the period of the counting, in order to evade any obligations which might follow the inclusion of their names and qualifications in the official records. For instance, in 1711 the Chinese authorities ordered a census for the purpose of compiling a register of persons liable to imposition of a Poll Tax, and to ascer-

tain the numbers of men available for military service. These returns showed a total of about 28 millions; a few years later, a further census was ordered requiring, in addition, information for the determination of measures necessary for the relief of distress, the recorded figures on that occasion amounting to 103 millions. On the face of these figures, one is inclined to the view that a large but unknown number of people purposely absented themselves from the first enquiry, but, imagining that it would be to their interests to be enumerated during the second enquiry, made it their duty to be present. Instances of similar wide variation in population records are not uncommon among the early documents recording population figures in European countries, and subsequent estimates based on these data can hardly fail to be misleading.

So far as European practice is concerned, it is generally admitted that, at no period prior to the end of the eighteenth century was it possible to form really reliable estimates of the population of the principal European States—in point of fact, not until the principle of regular census-taking had become an established system in each of these countries—this date varying between one country and another to a very considerable extent.

The United States have claimed to be the first country in the world to establish a system of regular census-taking, but that credit belongs to *New France (Canada)*, for the French authorities in those territories introduced census enumerations as early as 1665, a date long prior to any other census, whether American or European, and continued such operations at more or less regular intervals until 1754. The first of the series recorded a population of 3,215 souls (exclusive of the military), these being classified by families, persons, sex, age, civil state and occupation.* This early introduction of the principle was probably due to the fact that in France, distinguished administrators and men of science had persistently advocated regular census enumerations probably earlier than in other European countries. The *Duc de Sully* (1560–1641) and *Jean Baptiste Colbert* (1619–83) both favoured such enquiries; *Sébastien de Lauban* (1633–1709), Marshal of France, described in minute detail his plan for an annual enumeration of the French people in his volume *Dime Royale*, written in 1704 and printed secretly in Rouen in 1707. In fact, seventeenth- and eighteenth-century French literature is immensely rich in the references made to, and plans and proposals for, and against, census-taking, and it is not unreasonable to assume that the influence of such distinguished publicists must have been a factor in persuading other European nations to consider the importance of

* The original returns in manuscript are preserved in the *Archives Nationales, Paris*.

adopting methods or measures for the exact determination of the population within their own boundaries.

Between 1697 and 1700 a remarkable enquiry suggested by the *Duc de Beauvilliers* was carried out by the *Intendants des Provinces*,* and between 1727 and 1728 the *Comte de Boulainvilliers* published an exhaustive analysis of these reports, in the preface of which he emphatically advocates census-taking in the following words:—
“Disons que le seul moyen d’établir un juste gouvernement, de faire prospérer les rois et les peuples est la connaissance du détail des Empires.” On the other hand, such equally distinguished disciples of statistics as *Necker* and the *Chevalier des Pommelles* held strongly the view that a general census of the population of a country was a task utterly impossible of accomplishment, while even the great *Laplace* recorded his opinion (*vide Laplace, Théorie analytique des Probabilités*, p. 56 of the Introduction, 2nd edition, Paris, 1814) that census-taking was a difficult, tedious, and unnecessary operation. The following extract from the *Mémoires sur la Population de toutes les Provinces de France*, published by the *Chevalier des Pommelles* in 1789, is representative of the views of opponents of that time to the principle of general census-taking:—

“Il n’existe et n’a jamais existé aucun dénombrement général du royaume. Une énumération par tête qui, en premier aperçu, semble une chose si facile, non seulement serait très dispendieuse, mais, lorsqu’on y réfléchit, elle présente tant de difficultés dans l’exécution, qu’il est difficile de ne pas douter au moins de la possibilité et surtout de l’exécution d’une telle opération.”

I have quoted at some length from French literature because, as I have already remarked, it seems to me that it is necessary to emphasize the predominant importance of French influence in this field of statistics, but I will more briefly refer to the introduction of census-taking in other European States.

So far as Europe is concerned, *Sweden* led the way by ordering a census of the population in 1749. Population registers, having, according to some authorities, the value of censuses, had been carefully maintained since 1686, but census-taking as a separate operation was not practised. Two reports relating to questions of population, and prepared by *Pehr Elvius* † and *General J. Van Lantinghausen*

* Certain manuscript volumes of these original documents, *Mémoires des Intendants des Provinces*, 1679–1700, are to be found in the library of the Royal Statistical Society, having been presented to the Society by its first Secretary: presumably these left France during the troubled days of the Revolution.

† See *Det svenska tabellverkets uppkomst*, A. Hjelt, Helsingfors, 1900, and *Bevölkerungsstatistik Schwedens* (1750–1900), G. Sundbärg, Stockholm, 1907.

respectively, were submitted to the Riksdag in 1746 and promoted lively interest and discussion; there is little doubt but that these efforts were the factors which led to the passing of the *Law of February 3, 1748*, which provided for the compilation of tabular records of the population.

In *Austria* an enumeration of the population for taxation purposes was made as early as 1494. Other enumerations were made under the terms of the Rescripts of *October 13, 1753*, and *January 7 and February 16, 1754*, when the age, sex, and citizenship of the people seem to have been determined, while the *Decree of Joseph II in 1785* provided for a general census of the whole of the people. There seems to have been lacking, however, any provision for the regular repetition of the operation, and the census system was not definitely established until provided for by the *Law of March 23, 1857*. The first census taken under the new *Law* (which provided for the enumeration of the native population only) was effected on *October 31, 1857*. The Austrian census system was thoroughly modernized under the provisions of the *Law of March 29, 1869*, which ordered that for the future the census should be taken on *December 31* in each of the years whose final digit was *zero*.

As *Portugal* has been an independent State since the twelfth century, there is a considerable literature in which may be found detailed descriptions of the country and her people, but most of the early estimates of the population are purely conjectural, and obtained by relating an arbitrarily chosen multiplier (the supposed average number of persons per household) to the number of households estimated; the results are interesting calculations providing at best but approximate figures. Nine years before the establishment of the *Inquisition* in Portugal, the enumeration of 1527 was carried out, from the results of which the Portuguese population was stated to amount to 1,215,775 souls: on the other hand, an eminent authority, *Robello da Silva*, in his *Memoria sobre a populaçao de Portugal*, p. 71, estimated that the population of the country could not have exceeded 1,080,000 persons in 1580: * an enquiry instituted in 1801 recorded 2,930,524 persons: the census of 1838 gave 3,224,474, which three years later (1841) had increased to 3,396,972. Other censuses were taken in 1854, 1858, and 1861, but the history of modern census-taking in Portugal is always dated from 1864, since that census is invariably referred to in statistical literature as the *First Portuguese Census*. The history of census-taking in *Spain* closely resembles that of Portugal. Early records refer to the taking of a census in 1594; a census taken in 1723 returned 1,140,103 hearths, from which, by associating an average of six persons per hearth, and by the addition

* See also *O Povo Portuguez*, B. Carqueja, Oporto, 1916.

of the numbers of the clergy and nobles, the total population was estimated to amount to 7,625,000 persons. Similar operations were carried out in 1769, 1787, 1797, and 1803, but, as it was customary on occasion to exclude the privileged classes from the countings, the results were only approximations, and so far as Spain is concerned, the first really reliable census dates from 1857, since which year regular enumerations were made at decennial intervals to the year 1897, and thereafter in years whose final digit was zero.

In *Prussia*, census-taking at triennial intervals was definitely introduced in 1748, this practice being followed at varying dates by the other States which later comprised the Old German Empire, whilst the first general census of the various federated German States was carried out in 1834.

In *Scotland*, the first official census took place in 1755, on the recommendation and under the direction of Dr. Alexander Webster, Minister of the Tolbooth Church, and one of His Majesty's chaplains. This operation, one of the earliest of European national censuses to be taken, was a markedly successful attempt to ascertain the number of people living in Scotland at the time, the final results supplying information for each county, by parishes, the number of inhabitants, and number of "fighting men" (i.e. males aged eighteen to fifty-six) in each. The number of persons at each year of life (calculated) is also given for the whole country, but no distinction of sex is made in any of the results. The results of this census were never printed or published, but were preserved in manuscript form.

So far as Ireland is concerned, although *Petty*,* *South*,† *Bushe*,‡ *Beaufort*,§ and others had devoted considerable attention to the question of population in that country, and though *Arthur Young* in 1780 || had strongly recommended the Legislature to order an enumeration of the people, no official Irish census was taken before May 1813, and even then the results of that operation were entirely unreliable.

The *Law* of June 21, 1871, established the principle of decennial census-taking in *Italy*, and provided regulations for the organization of all future censuses in the kingdom, but it must not be forgotten that censuses of the people had been carried out in particular areas long before that date, as, for example, in the old *Kingdom of Sardinia*,

* *The Economic Writings of Sir William Petty*, edited by C. M. Hull. Vol. II., p. 555. Cambridge, 1899.

† *Phil. Soc. Trans.*, No. 261. Vol. XXII.

‡ *An Essay towards ascertaining the Population of Ireland*, G. Parker Bushe. Trans. Roy. Irish Academy, 1789, Vol. III., pp. 145-55.

§ *Memoir of a Map of Ireland*, etc. D. A. Beaufort, 1792.

|| *A Tour in Ireland*, Vol. II. p. 61. Arthur Young, 1780.

in *Lombardy* and *Venice* when under Austrian administration, in the Grand Duchies of *Tuscany*, *Parma* and *Modena*, and in the Kingdoms of *Sicily* and *Naples*.

In the *Seven United Provinces* of the *Low Countries*, early estimates of the population were generally based upon the records contained in the tax registers, the first effort towards general census-taking being found in the enumeration of the people in 1795. Population registers were planned as early as 1801, but were not introduced for general use before January 1, 1812. In 1815, the seven Northern and ten Southern Provinces became united under the title of *The Kingdom of the Netherlands*, and under that sovereignty census-taking at decennial intervals was established under the terms of the *Royal Decree* of September 29, 1828.* In the Northern Provinces the census was carried out in 1829, that for the Southern Provinces being planned for January 1, 1830. This enumeration took place in spite of the revolt of the Belgians in 1830, which led to the separation of the seventeen Provinces into the two kingdoms of *Holland* and *Belgium*; the results of this enumeration were published under the names of Quetelet and Smits in 1832.†

But even with the principle of regular census-taking definitely established in different European States, the first of the series of operations in the countries concerned was, in most cases, limited in the scope of its enquiries, and but imperfectly organized and controlled. It will be unnecessary for me to refer here to the conditions under which the English census of 1801 was taken, but it may not be out of place to make a passing reference to the initial efforts in other parts of Europe.

The first census of the Federated States of the German Union, taken in 1834, was carried out with such characteristic German thoroughness and attention to detail that a remarkable degree of accuracy was obtained at the first attempt. This result, however, is an exceptional experience in the history of census-taking, for in most other countries one finds that it is only after experience and after repeated efforts, with constant improvements and attention to organization of detail, that reliable results were achieved. In *Ireland*, the Act of 1812 "*For taking an account of the population of Ireland*" produced the most disappointing and unreliable results, in spite of the fact that the Act endeavoured to profit by the experi-

* See *Recherches sur la population, etc. dans le royaume de Pays-Bas*, L. A. J. Quetelet, 1827.

† Valuable references are contained in the Bibliography compiled by Xavier Heuschling in the *Bulletin de la Commission Centrale de Statistique*, Tome I. pp. 579-627, Bruxelles, 1843, and in the *Inventaires des Archives de la Belgique*, Bruxelles, 1837.

ences of the English census of 1801, and tried to anticipate and legislate for all possible difficulties during the course of the operation. The payment of census agents was governed by the numbers enumerated, and it is possible that owing to this method many officials were later found to have falsified their returns in order to swell the numbers relating to the areas for which they were responsible. Of the official results of this initial enquiry in Ireland, it was ascertained that, of the returns relating to forty Irish counties, only ten were satisfactory, twenty-four were defective, while six counties made no returns whatsoever.

Enumerations of the people of *France* between 1801 and 1831 had reference only to the resident population present in each Commune at the time of the census. No detailed instructions were issued by the central powers to local authorities governing methods and procedure to be followed during the operation, no special schedules were provided, and no fixed census date was decided upon, so that the census was taken at widely different dates in various parts of the country. It was not until 1836 that specific instructions were issued as to the procedure to be followed, and special household bulletins provided, and *it was not until 1881 that a fixed date was appointed*, so that the operation could be carried out uniformly throughout France.

In *Portugal*, endless difficulties have been encountered at every attempt to enumerate the population, and although the principle of decennial census-taking had long been adopted, censuses have been taken at varying intervals of from ten to fourteen years. As recently as the census of 1920, the *Director-General of Statistics* complained of the fact that, on the eve of the census date, agents refused to carry out their duties at the rate of remuneration formerly agreed upon, that schedules had been delivered but not collected, that the census was not taken throughout the country on the appointed day, and that local census committees had failed to carry out the duties for which they were responsible.* As a result of these defects, some of the results of the Portuguese census of 1920 were not received by the central authorities until 1923.

In this very brief survey, I have said nothing of changes in the form of census schedules, in organization of the operation, or in tabulation of the published results in different countries from time to time, all of which combine to hamper the activities of the investigator; but perhaps the descriptions I have submitted will be some indication of the difficulties which confront investigators when attempting to compare the census data of European countries with

* See *Censo da População de Portugal*, 1920, pp. xvi-xviii. Imprensa Nacional, Lisbon, 1923.

our own, and particularly, of how these difficulties become intensified when an endeavour is made to extend the enquiry back in time. The difficulties have to some extent been further increased in post-war years by the redistribution of territory and alteration of national boundaries under the various Peace Treaties. While some countries emerged from the World War in a greatly diminished condition, others found their boundaries extended and their populations increased: over $1\frac{1}{2}$ millions of people formerly owing their allegiance to Austria were added to the population of Italy, together with some 7,000 square miles of territory, as a result of the rearrangement of frontier boundaries under the Peace Treaty of St. Germain, 1919. Czecho-Slovakia, Austria, Hungary, and Roumania are other countries showing important increases or decreases of population, and alterations in their boundaries as a result of the war, and the data relating to these countries require the most careful examination when any attempt is made to compare the figures with those of other nations.

Even where we find careful collection of data, and strict regulations controlling all operations, the methods employed, the information sought by the various national census schedules, and the definitions applicable to the various terms in those schedules, differ so essentially that real comparisons of data are exceedingly difficult.

2. *Vital Registration.*

It would appear that vital registration, compulsory and applicable to the whole of the population, formed no part of the general administration of any European country before the middle of the eighteenth century; little, if any, conception of the importance of public health or preventive medicine existed, and in the absence of such knowledge the importance of vital statistics in matters of public health administration remained unrealized and undeveloped until the passing of the English Registration Act of 1837. Ecclesiastical records of Births, Marriages, and Deaths had long existed, and it might not be without interest to note the milestones which mark the history of this form of registration, prior to the establishment of compulsory registration in certain European States.

So far as Europe is concerned it would seem that the idea of maintaining such registers originated in Spain with the introduction of such records by the Archbishop of Toledo in 1497. It is also evident that such records were in common use in that country in the early part of the sixteenth century, for when *Pizarro* discovered and conquered Peru, he and his fellow-adventurers found, and commented upon, the admirable system of registration in use among the Peruvians, which was so efficient in operation as scarcely to have its

counterpart in the history of any semi-civilized community.* Parish priests continued to be responsible for the maintenance of such registers until 1871, when the communal magistrates or other functionaries of the Civil Service of Spain were charged with these duties.

It is not improbable, therefore, that Thomas Cromwell, who was responsible for the introduction of Parish Registers in England in 1538, conceived the idea during his continental travels in the early years of the sixteenth century, when he had probably seen, or heard, of the registers introduced by Cardinal Ximenes of Toledo. In 1563 the *Council of Trent* made the keeping of registers of Births and Marriages a law of the Catholic Church, and no doubt this order led to the introduction of such registers among the Catholic communities of the various European States. So far as *England* is concerned, orders relating to the keeping of Parish Registers were issued in the reigns of Edward VI, Mary, and Elizabeth. During the civil disturbances which marked the reign of Charles I, parish registration was greatly neglected, while the Parliament of 1645 provided for the registration of each *Birth* instead of Baptisms as formerly. In 1653 an Act of Barebones' Parliament provided for the establishment of civil registers in substitution of those maintained by the clergy, and for the appointment of a civil registrar for each parish: this plan, however, continued only until the Restoration, when the old system was resumed. In 1694, during the reign of William III, Parliament passed a further Registration Act for the general registration of births, marriages, and deaths; this Bill, however, was passed solely for the purpose of revenue and disappeared from the Statute Book at the end of five years; *Rose's Act* of 1812 provided for the uniformity in the compilation of such records, and this Act continued to regulate the maintenance of the registers until their supersession by the introduction of civil registration in 1837. In Ireland, one *Sir George Keare* seems to have been appointed *Public Registrar of Births, Marriages, and Burials* in 1617, having as assistants to this office four provincial deputies in Dublin, Armagh, Cork, and Galway. It seems to have been a curious appointment, for Keare was required to pay the Crown an annual sum of £20 for the privileges accruing from this office. This system seems to have continued for about three years, and no records seem to have been

* The Spanish historian Sarmiento, writing in the year 1554, expressed surprise at the excellent regulations which covered registration throughout Peru, e.g.: "Cada provincia, en fin del año, mandava asentar en los quipos por la cuenta da sus nudos, todos los hombres que habian muerto en ella en aquel año y por el consiguiente los que habian nacido, y por principio del año que entraba, venian con los quipos al Cuzco."

discovered of the results of this initial attempt at Irish registration. About this time, too, we find the first references to Irish Parish Registers, the oldest Parish Register extant being that of St. John's, Dublin, which dates from 1619.

In *Scotland*, similar registers of Baptisms and Marriages were established in 1551, but records of Burials were not provided for until 1616. For the next 200 years, however, these parochial records applied only to members of the Established Church, and it was not until 1816 that the *General Assembly* recommended that the Registers should contain particulars of Births, whether the parents were Churchmen or Dissenters, and of Deaths of persons whether buried in the parish burying-ground or elsewhere. These records were but negligently maintained, and no satisfactory system existed before the establishment of compulsory registration in 1855.

The first definite and organized effort in *France* is expressed in the terms of the *Ordonnance of Francis I* in 1539, under which parish priests were required to maintain registers of baptisms and burials relating to the persons within the limits of the parish. The Ordinance of Henry III, 1579, provided for the maintenance of the registers of Births, Marriages, and Deaths, but whether this injunction was strictly observed, or whether baptisms and burials continued to be registered, I am not able to say. Under the terms of a Decree of April 9, 1736, parish clergy were required to deposit annually a duplicate copy of entries made in their registers with the Clerk of the Royal Bailiwick in the province in which their parishes were situated, while in 1772 the Abbé Terray, Finance Minister to Louis XV, introduced measures for the annual collection of the data relating to Births and Deaths with a view to their ultimate publication. The letter he addressed to the *Intendants des Provinces* is of considerable statistical interest, and its reproduction here may not be considered out of place :—

A Compiègne, le 14 aout 1772.

“ *Monsieur,*

“ *Il est très important pour l'administration de connoître exactement l'état de la population de royaume, et cette connaissance ne sera pas moins utile à chacun de MM. les Intendants des Provinces. Je vous prie, en conséquence, de vouloir bien faire travailler chaque année à un relevé exact de la population de votre généralité, conformément au modèle d'état que vous trouverez ci-joint. Ce n'est pas un dénombrement par personnes, ménages, ou feux que je vous demande, ce dénombrement, quoique facile, exigerait trop de temps et de soins pour être renouvelé chaque année ; c'est un relevé que je vous prie de vous faire remettre tous les ans par les greffiers des juridictions royales,*

des naissances, mariages et morts dans chaque paroisse, chapitres, communautés séculières ou régulières, et monastères ou autres églises qui seroient en possession de célébrer les mariages, d'administrer les baptêmes ou de faire des inhumations, auquel vous ferez ajouter le nombre de sujets de l'un ou de l'autre sexe qui auront fait profession en religion et qui seront décédés dans les monastères et maisons d'hommes et de filles tenant des registres de profession et mortuaires. Les états que je vous demande doivent renfermer huit colonnes ; la 1^{re} contiendra le nom des paroisses ; la 2^{me}, celui des chapitres, communautés, hôpitaux, ou autres églises où l'on tient des registres des baptêmes, mariages, ou sépultures ; la 3^{me}, le nombre des naissances ; la 4^{me}, celui des mariages ; la 5^{me}, celui des morts ; la 6^{me}, celui des professions en religion ; la 7^{me}, celui des sujets morts dans cet état ; enfin, la 8^{me} servira pour les observations que vous jugerez à propos de faire soit sur les causes de mortalité ou dépopulation, s'il en survient de notables, soit sur les autres objets qui vous paraîtront susceptibles d'être mis sous les yeux de l'administration.

“ Vous terminerez cet état par une récapitulation par chaque élection et vous y joindrez la récapitulation générale de votre département. Pour mettre plus d'uniformité dans ce travail et y répandre plus de clarté, vous voudrez bien observer de ranger dans chaque élection vos paroisses par ordre alphabétique, cette manière de les distribuer les placera chaque année dans le même ordre.

“ Je vous prie de vous livrer dès ce moment à cette opération et de commencer ce travail par les années 1770 et 1771, qui seront distinguées par des états séparés pour chacune de ces deux années. Je pense que vous serez bien servi par les greffiers des bailliages en les intéressant un peu. Si le ressort de leur juridiction s'étendait sur plusieurs généralités, vous ne leur demanderez que le relevé des paroisses qui seront situées dans votre département. Plus cette opération présente d'utilité, plus j'espère que vous y apporterez de zèle et d'exactitude. Elle est d'ailleurs d'une exécution facile.

“ Vous savez, Monsieur, qu'aux termes de l'article 17 de la déclaration du 9 avril 1736, les curés, vicaires, desservants, chapitres, supérieurs des communautés ou administrations des monastères sont tenus de déposer chaque année au greffe du bailliage roïal dans le ressort duquel ils sont situés, un double de leurs registres de baptêmes, mariages et sépultures. Le relevé que vous demanderez aux greffiers deviendra un motif pour ces personnes d'envoyer ces registres, et aux officiers des sièges roïaux de les exiger régulièrement. Ce n'est point le dépouillement de ces registres nom par nom que vous demanderez, mais seulement, comme je vous l'ai observé, le nombre exact des naissances, mariages, sépultures, professions et morts en religion.

“ Il faut obtenir des greffiers qu'ils distinguent avec soin à l'article

des naissances et des morts le nombre des sujets de l'un et de l'autre sexe. Cet état formé pour l'universalité du royaume fera connoître en peu d'années s'il naît ou s'il meurt plus de mâles ou de femelles et dans quelle proportion : pour faciliter aux greffiers cette opération, je crois qu'il seroit à propos de leur faire remettre des états imprimés dont ils n'auront que les colonnes à remplir, et enfin qu'ils ne se trompent point sur les paroisses qui sont de votre généralité, vous voudrez bien leur faire imprimer le nom des paroisses dans la première colonne qui, étant rédigée dans l'ordre que je vous ai indiqué, ne sera point sujette à variation.

"Je vous prie de vouloir bien prendre toutes les mesures nécessaires pour qu'il ne se glisse, s'il est possible, aucune erreur dans cette opération que je recommande avec beaucoup d'instance à votre zèle ordinaire pour ce qui peut intéresser le bien du service.

*"Je suis, Monsieur, votre très humble et très obéissant serviteur,
"TERRAY."*

It should be remembered, however, that up to this time all the regulations quoted had reference only to professed Catholics, and that it was not until 1787 that these provisions were extended to include Protestants also. In 1792, vital registration was secularized, and communal and municipal mayors were henceforward charged with the maintenance and safe custody of the registers, a custom which is continued down to the present day.

It seems clear that a system of ecclesiastical registration was also in use in Germany from early times, for Bücher's work relating to the population of Frankfort-on-Main was based upon information contained in the parish records of that city during the Middle Ages. But interest in vital statistics seems to have developed somewhat late in Germany; it is not until towards the middle of the eighteenth century that the influences of foreign statistical activity begin to make themselves felt, and coincidentally *Johann Peter Süssmilch* (1707–1767) published in 1742 his great work, *Betrachtungen über die Göttliche Ordnung in den Veränderungen des Menschlichen aus der Geburt, dem Tode, und der Fortpflanzung desselben erwiesen*, which was made possible by the records contained in the parish registers of 1,000 villages of Brandenburg and other cities and States of Germany.

The oldest Swedish parish register dates from the year 1608, and the custom of maintaining such registers seems to have become general in Sweden during the seventeenth century; by the ecclesiastical law of 1686 the system became obligatory throughout the country, while, in addition, the priest was required to compile a list of persons taking up their residence in, or moving out of, a parish.

In 1721, measures were introduced requiring the despatch of registration summaries at intervals to the then Board of Health, and in 1748 a regular vital statistical system was established and annual summaries were required to be made on specially printed schedules.

Perhaps I have said sufficient to indicate that the old system of Parish Records by the clergy was generally followed in the various European States long before the establishment of compulsory registration in those States. It remains to say that with the exception of the Scandinavian countries, ecclesiastical registration of this kind was not an unqualified success in any State; entries were occasionally meagre and irregularly made; there was an absence of uniformity in the compilation of such records, so that registers relating to different parts of the same country were not of equal value; the system did not apply to the whole of the population, and, generally speaking, the records related to baptisms and burials, and not to *births* and *deaths*; efficient supervision and enforcement of regulations framed for the proper maintenance of these registers were lacking, and it would be no exaggeration to say that, no properly kept and dependable vital statistical records existed in Europe before the establishment of compulsory registration in the various countries.

Modern Registration Systems.

With the establishment of compulsory registration, the principles underlying the registration of births and deaths became fundamentally the same throughout all the States of Europe, since they required for each act of registration—

- (a) *Declaration*, i.e. the announcement of certain facts by responsible persons prescribed by law.
- (b) *Inscription*, i.e. the written record of such facts by authorized officials.

Yet, although the underlying principles of registration may be fundamentally similar, the details of procedure and practice may show wide variations between one country and another, and I therefore propose discussing in the pages which follow—

- i. The different dates at which compulsory registration was introduced in the various countries.
- ii. Differences in practice or procedure in the registration of births and stillbirths.
- iii. Differences in practice and procedure in the registration of deaths.

i. Dates of Introduction of Compulsory Registration.

As soon as one begins examining the literature relating to this matter, wide variations in the dates on which compulsory vital registration was introduced in various countries are at once noticeable, since the dates range between 1686, when this practice was introduced in Sweden, to 1911, when registration was made compulsory in Portugal.*

I give in Appendix I a list of the principal countries in Europe together with the dates on which compulsory registration was introduced. I think presentation in tabular form makes the matter much more clear than it could otherwise be, and here I would recall a valuable and interesting paper, *Stillbirths in Relation to Infantile Mortality* by our lamented colleague, Dr. Reginald Dudfield, containing many data of this kind, which was read before the Society on November 9, 1912, and appears in Vol. LXXVI of our *Journal*.

ii. Differences in Practice and Procedure in the Registration of Births and Stillbirths.

In the first place, attention must be called to the varying period allowed in different countries for the declaration of the facts relating to births, since these range between three days and forty-two days, in some States no time limit is prescribed, though in such cases it is usually understood that the births should be registered within twenty-four hours after birth has taken place. In the majority of countries the responsibility for declaration is imposed upon the parents when the child is legitimate, and if illegitimate, upon the mother only, and in their default upon the persons in attendance upon the mother at the time of birth. In *Belgium*, on the other hand, this responsibility is imposed upon all persons present at the time of birth without distinction, while in certain other countries, doctors and midwives are required to submit regular returns of all births at which they have assisted.

In our own country, until July 1927, registration of births was limited to the registration of live births only, though the notification of children born dead after twenty-eight weeks of uterine gestation was also required. Under the terms of the *Births and Deaths Registration Act*, 1926, which became operative on July 1, 1927, the birth of every stillborn child in England and Wales became registrable. In certain other countries, for example, *Belgium, Holland, Austria, Spain, Portugal*, etc., the registration of stillbirths is compulsory, but in this connection, special attention is called to the definition of "still-

* Registration was introduced in Portugal in 1886, but was not generally compulsory prior to 1911.

born," and to the practice of registration relating to stillbirths in different States. In *Spain*, children born alive, but dying within twenty-four hours of birth are regarded as stillborn, although for statistical purposes they are separately tabulated. In *Belgium*, and (until recently) *Holland* and *France*, children born dead, and those born alive but dying before the date of registration (three days) were regarded as "stillborn." It is customary in these countries more recently to tabulate the actual stillbirths separately from those "*présenté sans vie*." The registration of stillbirths is generally compulsory throughout the *German States*, though in the majority of these States there is no definition of "stillbirth" or "stillborn" prescribed by law. In certain States, however, a definite interpretation of these terms has been adopted for purposes of registration, but I think I am correct in stating that no two States have adopted exactly the same definitions. In *Italy*, though no specific definition of the term is legally prescribed, in actual practice, all infants dying *in utero* or *during birth*, having reached a stage of development which indicated the possibility of independent existence, or after the 180th day of gestation, are regarded as *stillborn*. For statistical purposes *only*, registration officials enquire at the time when declaration of birth is made, whether the child was *actually* stillborn or had died shortly after birth, such information being recorded on the individual bulletin. A curious custom of considerable importance from the statistical point of view is observable in Austria and in some areas in German territory. For religious reasons, in Catholic districts, *e.g.* the Austrian Tyrol, all stillborn children are baptized as though they were live-born, and a note made in the register to the effect that such children "*died a short time after birth*."

It will have been gathered that, with these different definitions as to the exact meaning of "stillbirth," some difficulty will be experienced in endeavouring to compare infantile mortality rates in certain countries with those of England and Wales, Norway, Sweden, etc., where a child born alive, and living for however short a time, is regarded as a live birth. The general question of infantile mortality is of such importance in the field of vital statistics that it is surprising to find statistical information on other points meagre, and methods of tabulation as widely different as are the definitions of the term "stillbirth." For instance, the higher death-rate among illegitimate children is proverbial, but tabulation by legitimacy is not infrequently disregarded in some countries; deaths during the first day, week, or month of life are by no means regularly tabulated for all States: diarrhoeal and respiratory diseases, which claim so high a toll of infant life with varying seasonal incidence, are principal

causes of mortality among infants, yet too often no provision is made in some countries for the tabulation of data relating to these matters.

The officials responsible for the safe custody of the registers, charged with the duty of receiving all declarations of births and deaths, and with the inscription of all such declarations, may, in different countries, be communal magistrates, civil functionaries of the State, or clergy, as the case may be. In *Austria*, the clergy of specified religious communities are the responsible authorities, though the civil authority in each area also maintains special registers for particulars relating to persons of no acknowledged religious community or belonging to sects for whom special registers are not provided. This procedure was customary in *Hungary* until 1894, but in 1895, civil registration by officials of the State was introduced. In *Czecho-Slovakia*, the Austrian system was adopted in the Western Provinces (Bohemia, Moravia, Silesia), and the Hungarian system in the Eastern Provinces (Slovakia, Carpathian Ruthenia) until the end of 1924, but in 1925 a uniform system was established throughout the country. Civil registration offices (*Standesbeamten*) were established in the various registration areas in the German States in January 1876, following the promulgation of the *Federal Law of February 6, 1875*. Magistrates and civil functionaries have been in charge of the registration duties in Spain since 1871, and in Portugal since 1911. In 1792, registration was secularized in France, and since that date communal and municipal mayors have undertaken the office and duties of an *Officier de l'état civil*. In *Belgium* and *Holland*, the Burgomaster or his deputy has been similarly responsible since 1805 and 1815 respectively, while in the Scandinavian countries, the clergy are charged with these duties.

iii. *The Registration of Deaths.*

In this branch of vital statistics even more remarkable differences are noticeable; changes in procedure, classification, and the introduction of different nomenclatures from time to time, are but some of the difficulties and differences which provide pitfalls to hamper the course of the investigator attempting international comparisons of data, and though I cannot, in the course of the following observations, deal exhaustively with the subject, my references may serve as an introduction to the study of different conditions of practice and procedure in so far as continental mortality data is concerned.

In the first place, registration of the mere *fact* of death is obligatory under the law in nearly every European country, though the date at which such legislation was introduced varies very greatly between one country and another. Special registration officers

charged with the duties of inscription are the general rule, the exception being those of *Denmark, Finland, Norway, Sweden, and Serbia*, where the clergy are still responsible for this duty. In the majority of countries the list of persons and the order of their responsibility so far as registration is concerned do not differ materially from those prescribed in our own country, but in the matter of the *period* prescribed for the declaration of deaths, this varies between somewhat wide limits, ranging as it does from *twenty-four hours* to as much as *eight days*, while in some European countries, different periods are prescribed for towns and rural districts (see Appendix I). In many countries no burial can take place without the issue of a burial permit, this being contingent on the fact that the death has been declared and registered before the competent authority. Fines and other punishments are incurred in such cases where the laws relating to the registration of death are not complied with.

All these efforts on the part of the Central Administration authorities in various countries represent an endeavour to secure the complete registration of the *numbers* of deaths in those countries, and it remains now to consider the different procedures and different forms of questionnaires employed in different areas; this might more easily be done perhaps by discussing in turn—(a) methods of certification, and (b) methods of classification.

(a) *Methods of Certification.*

Even the most cursory consideration of the rules and other circumstances governing certification of cause of death in different countries is sufficient to suggest that in the face of the many variations of procedure the data resulting from the different systems can hardly be comparable. In the first place, the value of the statement of the *cause* of death will depend upon whether this has been supplied by a medical or non-medical certifier; and even if the certificate has been completed by a qualified medical practitioner, the accuracy of the statement contained in the certificate will further depend upon whether the certifying physician was the medical attendant of the deceased during his last illness, was otherwise acquainted with the sickness resulting in death, or was merely an official verifier of deaths, called, in his official capacity, after death had taken place. In this connection we are faced with an exasperating range of practices in European countries; in one country the attending physician performs this service; in another an official medical verifier of deaths is responsible; while in other cases a non-medical person may be authorized to perform the duty.

In *England and Wales, Scotland, Ireland, Holland, Germany,*

Switzerland, Italy, the medical certificate recording the cause of death is generally completed by the attending physician; this is ordinarily true, to some extent, in *Austria, Hungary, Denmark*, and parts of *Norway and Sweden*, but in *Austria*, in the absence of an attending physician, a communal authority instructs the official medical verifier (*Gemeindearzt*) to examine the body with a view to determining the possible cause of death; in *Denmark*, in the absence of an attending physician, and if the death is certified by a non-medical person, no cause of death is usually recorded, except in the case of a death due to violence. In the rural districts of *Norway and Sweden*, the parish priest may be required to obtain the cause of death verbally from members of the family. In certain other countries, in the absence of an attending physician during the last illness, or at the time of death, the communal authority may authorize the local medical officer of health, or medical practitioner, authorized to act in that capacity, to examine the body with a view to determine the possible cause of death. In *Belgium* there exists no legal provision for the medical certification of deaths, though medical practitioners are invited to supply this information. As early as 1866, an attempt was made by the then Minister of the Interior to secure certification of cause of death throughout the country; a special circular was issued which described at length how this should be done; a nomenclature of 116 causes and a special form of medical certificate were supplied, but the suggestion was not adopted. It is true that in the large cities in *Belgium* it is usual for the attending physician to certify the cause of death, but in rural areas the declaration of the probable cause of death made by surviving relatives or near neighbours of the deceased is deemed sufficient.

In *France*, the law prescribes that the *fact* of death shall be certified by an official medical verifier of deaths, by a medical practitioner, or by a public health official, this measure being introduced under the terms of the regulation of the Minister of the Interior, December 12, 1866, and designed primarily to prevent cases of premature burial; there exists, however, no legal enactment requiring the certification of the *cause* of death. The legal record of death, *i.e.* the *acte de décès*, contains no reference whatsoever to the cause of death, this omission being probably due to the fact that *Article 378* of the *French Penal Code* prescribes that a medical practitioner must not, under pain of severe penalties, divulge any information whatsoever acquired by him during the course of his professional duties. Actually, French officials charged with the duty of verifying the fact of death endeavour to discover, where possible, the cause of death by personal examination of the

body, and by enquiry of surviving relatives or near neighbours of the deceased; hospital authorities generally state a cause of death, and occasionally attending physicians voluntarily do so. In rural districts, however, notification and certification of cause of death are frequently performed by non-medical persons, and it has been estimated that nearly 50 per cent. of all deaths over fifteen years of age have, at times, been certified by non-medical persons. Knowledge of the extent to which certification of cause of death by non-medical persons may be practised in different countries is of first-rate importance, for such certificates are of but little value—except perhaps in the case of death due to violence, where the cause of death may be obvious—and if included in the total deaths of a country, they can only serve to render such statistics as exist unreliable. In parts of *Belgium, France, Czecho-Slovakia, Hungary, Germany*, and in the rural areas of Scandinavian countries, cause of death may be declared by non-medical persons, and, in fact, in *Hungary* and in *Czecho-Slovakia* a special nomenclature was provided for use by non-medical verifiers of deaths.

Even given a system that ensures that few deaths ultimately escape registration, the accuracy of recorded causes of death may be affected to some considerable extent by such special circumstances as inaccessibility in mountainous areas, and to numerical insufficiency of physicians in other areas to ensure a general medical certification of cause of death; *Switzerland*, parts of *Austria* and *Hungary*, the *Balkan States*, some parts of *Italy*, all have their regions which are difficult of access. In *Spain*, on the other hand, though there is approximately one medical man to each 850 of the population, yet the accuracy of the recorded causes of death is not regarded as of high value, for the reason that, in remote country districts of Spain, where medical attention is not readily available, the medical practitioner not infrequently reaches a case after death has occurred, but completes a certificate of cause of death from information derived from surviving relatives, or from neighbours, and after examination of the body, while in case of doubt affecting the deaths of persons aged fifty-nine or over, the death is usually ascribed to "senility."

Intimately associated with the question of certification of cause of death is that governing the secrecy of the statement of the cause of death, for this is a matter which may very seriously affect the reliability of the statistics of causes of death. It is not unreasonable to suppose that, while the certifying physician may wish to record the cause of death with the greatest possible accuracy, influenced to some extent by his regard for the feelings and interests of the surviving members of the family, he may be persuaded to modify his original statement, or even suppress entirely all reference to certain

forms of disease. This may apply more particularly to cases of venereal disease, and, in some districts or countries, to deaths due to tuberculosis. In such circumstances, where particular diseases are held to reflect upon the physical soundness of the family to which the deceased belonged, certifying physicians may experience some embarrassment if called upon to inscribe a cause which might be considered to prove harmful to the surviving members of the family, and it is possible, in the face of such prejudices, some concealment of the actual cause of death may occur. The degree of importance, in the eyes of the central administrative authorities, attaching to this question of secrecy of the document varies enormously between one country and another.

The *English* registration system did not regard the statement of the cause of death as confidential; on the contrary, the law provided that the cause of death must be known to the family and it was recorded on an open certificate. Under the *Births and Deaths Registration Act, 1926*, new regulations came into force, but even under the new conditions, certification is still not really confidential. There is some advance, in that the certificate handed to the informant contains no statement of the cause, but a copy of the entry of the cause of death made by the registrar is obtainable on payment of the statutory fee. No uniform system appears to be common to all the States of *Germany*, and we find open certificates in some of the large cities, these being handed to the surviving relatives, while in other areas, *e.g.* in *Bavaria*, the attending physician forwards the certificate direct to the official district medical officer of health; in *Holland*, certifying physicians are required to forward their statements in specially provided official envelopes, carefully sealed. In the larger cities of *Belgium* it is usual for the attending physician to leave a sealed note with the family of the deceased, this being handed by the declarants of death to the registrar, who forwards it unopened to the local Bureau of Hygiene or statistics. In the smaller communes, however, the cause of death is reported verbally to the Registrar. In *Denmark, Norway and Sweden, Spain, Portugal, and Austria*, open certificates are the general rule. In *France*, in such cases where the cause of death is recorded, it is not seen by members of the family, but is strictly preserved for statistical purposes only. In *Italy*, part of the individual death bulletin is filled in by the registrar, who then forwards it to the attending physician for completion as to cause of death. When this has been done it is forwarded to the Central Statistical Bureau, Rome, and is not seen locally. A similar plan is followed in *Hungary*. In *Switzerland*, the *Acte de décès* is drawn up by the registrar on information supplied by the declarants, and from this information an individual bulletin for

each recorded death is prepared. Each bulletin comprises three parts, perforated between Parts 1 and 2, so that Part 1 may be easily detachable. The first part contains the name of the deceased only; the second part age, sex, civil state, etc.; the third part the medical certificate. Parts 1 and 2 only are filled in by the registrar, and then forwarded, together with a return envelope, to the physician who attended the deceased during his last illness. The certifying physician concerned fills up Part 3, detaches Part 1 (name), which he retains, and returns only the anonymous Parts 2 and 3 in the official envelope, which is sealed and addressed to the registrar. The envelope bears, on its face, the number of the *Acte de décès* to which it refers, and on the reverse side the injunction, "*To be opened only at the Federal Statistical Bureau.*" Following the receipt of such envelopes at the local registration office, the numbers on each envelope are checked, and at the end of each week all envelopes received during the current week are forwarded, still unopened, to the Federal Statistical Bureau at Berne, where the data are used. In this manner absolute secrecy is maintained. Information relating to the certification of *cause of death* in various continental countries is summarized in Appendix II.

Next comes the consideration of the questions upon the medical certificate to which the certifying physician is required to make reply, and this constitutes a matter of great importance, since it follows that the statement made by the certifier will, to a large extent, be governed by the manner in which the question is framed, since a cause of death may be so complicated as to allow of more than one reply. In Holland, the question simply asks, "*Cause of death?*" and in France, "*Disease or Accident causing Death?*" In Spain and Hungary, on the other hand, in addition to the name of the disease causing death, space is provided for any additional or special observations the certifying physician may have to make. In our own country the old certificate called for *Primary and Contributory Causes of Death*, but in the new form of certificate, introduced under the *Births and Deaths Registration Act, 1926*, the questions answerable became "*Immediate Cause*," "*Morbid Conditions, if any, giving rise to immediate Cause (stated in order proceeding backwards from immediate Cause)*," "*Other Morbid Conditions (if important) contributing to Death but not related to immediate Cause.*" The Austrian certificate requires (a) "*Principal Malady*," (b) "*Immediate Cause of Death*," (c) "*Special Remarks*"; the Portuguese, (a) "*Principal Disease*," (b) "*Contributory Cause*"; the Swiss, (a) "*Primary Cause*," (b) "*Consecutive Disease and Immediate Cause of Death*," (c) "*Contributory Causes, or other circumstances worthy of mention*"; the Italian, (a) "*Primary Disease*," (b) "*Ter-*

mental Accident"; and so far as Germany is concerned, while in some States only one cause of death is demanded, in other States several questions appear on the certificate.

The examples I have quoted may be deemed sufficient to illustrate the range of differences existing in so far as the form of medical certificate of cause of death is concerned in parts of Europe, and it is not unreasonable to assume that national conceptions of such terms as "Principal Cause," "Immediate Cause," "Primary Cause," "Secondary Cause," and so on, may be so widely different; for instance, the words "primary" and "secondary" may in one country be held to indicate the relative importance of the diseases quoted, while in another country they may represent the order of succession in the manifestation of the causes which terminated in death. Such differences of interpretation must result in confusion and difficulty when attempts are made to compare the data of one country with those of another.

(b) *Methods of Classification.*

It will now be necessary to refer to differences arising from varying methods of classification of causes of deaths, and of the national nomenclatures in use.

It is true that an international list of Causes of Death has been in existence for nearly thirty years, and that the majority of European countries have long agreed to adopt this nomenclature, yet there remain many different nomenclatures in use at the present day, while, in addition, many of the lists of Causes of Death have undergone extensive changes since the dates of their introduction. *Reports of the English Registrar-General* have regularly called attention to the changes introduced in this country, but such information for other European countries is not always, nor so readily, available. In this connection I may call attention to the fact that the *French* authorities have made use of five different nomenclatures since 1886; as a result, the data relating to Causes of Death for 1890 and 1900 are by no means comparable; several changes have occurred in *Italy* since 1881; a list of 142 titles was adopted in 1881; in 1883 a nomenclature of 168 titles was introduced, while in 1924 a new list of 225 Causes of Death (or, with sub-titles, 264 Causes) superseded the old list. In *Germany* no comparison of mortality data between the various States is possible before 1905, when a uniform nomenclature was adopted for use throughout the Empire; at the time of the change there existed a *Federal* nomenclature of 15 Causes, *Prussia* made use of a list of 30 Causes, *Bavaria*, 67 Causes, and *Baden*, 167 Causes, while other States had their own nomenclatures, which differed in greater or lesser degree from each

other. The position in regard to nomenclatures in the principal European countries *at the present day* is, I think, something after this manner :— *

- (a) *Using Special Nomenclatures.*† Italy (225); Austria (25); Hungary (27 causes for use of non-medical verifiers, a detailed list of 179 causes for use of medical practitioners); Czecho-Slovakia (Hungarian and Austrian lists until 1924); Norway (131); Sweden (101); Denmark (133); Germany (since 1905, 23 titles); Switzerland (23 and 253).
- (b) *Abridged International List only.* Belgium, France, Portugal, Spain.
- (c) *Detailed International List.*‡ England and Wales, Scotland, Ireland (since 1911), Czecho-Slovakia (since 1925), Holland, Germany (to be adopted), United States of America.

But the differences and difficulties do not end here; methods of classification are various. In countries such as our own, in *Switzerland, Italy, Holland, Germany, the United States of America*, the original certificates of death are forwarded to a Central Statistical Office, attempts are made to regularize vague descriptions by further enquiries, and the data are finally classified according to a definitely established procedure by technically competent officials; in certain other countries, e.g. *Spain, Portugal, Czecho-Slovakia, Austria, Belgium*, etc., classifications are made, and summaries compiled, by local authorities, upon printed forms supplied for the purpose, the national statistics in such cases being further summaries of these compilations; in other words, technical operations requiring specialized knowledge may be carried out by people lacking either medical qualifications or the statistical training necessary to the task. Even where the work is carried out at, and by, the Central Statistical Bureaux, the rules governing procedure in classification, and procedure in general, are by no means alike in such Central Offices, nor are systems of enquiry designed to rectify vague terminology conducted upon a common basis. In some areas, where two or more joint causes of death appear on the same certificate, the primary cause is that adopted for purposes of classification; in other areas, the *more important* cause is selected: certain causes of death which are regarded as indefinite, and as such are the subject of further enquiry in one country, but are accepted without question

* Various nomenclatures are presented in Appendix III.

† Figures indicate numbers of titles.

‡ In addition, certain countries publish special classifications to meet particular national needs.

by the authorities of other countries (e.g. *peritonitis* is an accepted cause in Holland and Italy but is invariably queried by the English authorities).

The period allowed for the despatch of data to the central authorities is a further item of importance, for if, under any national system of registration, the complementary organization of control is so loosely administered as to permit of the occurrence of delays in the transmission of data to the central authorities, or allows the possibility of failure to deal with incoming data immediately they are received by the central authority, then it becomes difficult, if not impossible, for those authorities to institute enquiries which are likely to be fruitful in such cases where they have reason to doubt the accuracy of the information recorded. Many registration systems are excellent *on paper*; they may be widely comprehensive, logically conceived, and capable under proper organization of furnishing information which should be both complete and dependable; yet in *actual practice* they fail, and produce results which can only be regarded with considerable distrust from the point of view of accuracy. In support of this argument I may be allowed to quote the following experiences. Not so very long ago, when visiting the central organization of one European country in search of information as to their system and methods, I was afforded a striking instance of the extent to which delays are possible. On the table of the Branch designed to receive and classify medical certificates of death lay a dusty heap of unopened envelopes. On enquiry I was informed of the nature of their contents, and at my request samples were opened. By the merest chance, every certificate recorded a death due to some severe form of epidemic disease; according to their regulations these cases should have been dealt with weeks before the date of my visit; still further, under the rules of that service, provincial authorities were required to forward at monthly intervals summaries of all deaths occurring within their particular area, classifying them by age, sex, and cause of death; if it is assumed then that such summaries *were* received on the appointed date by the Central organization, we are forced to the conclusion that, after the despatch of the monthly schedules, this or that provincial authority discovered certain certificates still unopened and unrecorded, which were forwarded to the Central statistical office, there again to be overlooked. In some areas too, in spite of a grandiose *paper* organization, the systems designed for supervision and to ensure the maintenance of dependable local vital statistical records are so utterly inefficient or defective as to be worse than useless. For example, in another European State it was the custom of the local registrar to chalk upon the walls of his office

particulars of the births and deaths of which he had been notified, despite the fact that the regulations of that State called for the inscription of the particulars in the registers provided for the purpose at the time of declaration. No doubt this registrar entered up the facts in his registers at the time when he compiled his monthly summaries (for such were required on a specified date each month), presumably, from these original "wall records." Unfortunately, during his absence on one occasion, his wife subjected the office to a "spring clean," in the course of which the walls were washed and the records disappeared. I am not acquainted with the subsequent history of this affair, but I cannot imagine that anything very dreadful happened, since one of the most emphatic registration rules relating to the State to which reference has been made reads, "*This Return* (i.e. the monthly summary) *must be rendered without fail each month, even though there may be no inscriptions recorded during the month under review.*" It is not without interest to note that the authorities in this State have recorded in an official report, "*Few, if any, deaths escape registration.*"

I think I should call attention at this point to the reasons which have persuaded me to confine this paper to the discussion of vital registration in European States, to the exclusion of all references to systems prevailing in extra-European territories. The latter are of such importance—as, for example, the registration systems of the United States and Australasia—that considerable space would be occupied in referring to systems practised in those areas, and, further, I wish to confine my observations to discussing registration systems that I have been privileged to study at first hand in the various countries concerned.

It will, I think, appear from the preceding descriptions that even now, in many civilized States, the official records contain serious and remediable defects, and that we are still far from the time when the comparison of rates of mortality, even from the most important diseases, can be undertaken without hesitation; Rosenfeld's criticism of the statistics of mortality from tuberculosis* is applicable to most other causes of death. In helping to remove some obvious and even glaring defects, such as have been noted in this paper, the influence of international statistical organization, such as the International Statistical Institute, and the technical branches of the League of Nations,† can, and will, be beneficially exerted. I can only hope, however, that in this work the old proverb

* *Die Tuberkulosestatistik*, Dr. S. Rosenfeld (Vienna). League of Nations publication, C.H. 284, pp. 19 *et seq.*

† See *A Preliminary Report on the Comparability of Data on the Causes of Death*. League of Nations publication, C.H. 168, 1924.

that "the best is the enemy of the good" may not find another exemplification. I have remarked in this paper that it is not hard to find instances of excellent theoretical schemes which do not work well in practice. In reading various proposals for the improvement of rules of classification and tabulation, it has sometimes seemed to me that enthusiastic official statisticians are seeking to get more from statistical returns than those returns can fairly be expected to yield. It is, I believe, an axiom in our own country that the Central authority does not tabulate and analyse causes of death, but what medical practitioners report to be the causes of death. To a lay statistician like myself this rule seems to be common sense. Yet I am free to confess that some of the proposals for classification which I have seen seem to postulate in Central offices an ability to determine more accurately what caused a death than the certifying practitioner possessed. This seems to require an affirmative answer to the historic question addressed by a young lady to Babbage of calculating machine fame—"Pray, Mr. Babbage, if you ask your machine the wrong question, will it give you the right answer?" and, with the utmost respect for the medical and statistical ability of the various Registrars-General and their staffs, I do not believe they are competent to this extent. In my submission, much far simpler work remains to be done before our Central statisticians need aspire to the rôles of Mr. Sherlock Holmes or Dr. John Thorn-dyke; there is even a danger that if the Central authorities take too much upon themselves, medical practitioners may pay even less attention than they do at present to the official publications.

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APPENDIX I.

The Registration of Births and Deaths.

| Country. | Com- pulsory? | Since? | Births. Period allowed for Declaration. | Deaths. Period allowed for Declaration. |
|----------------------|------------------|----------------------|--|--|
| England and Wales | Yes. | 1837* | 6 weeks. | 5 days. |
| Ireland | „ | 1864 | 6 weeks | 5 days. |
| Scotland | „ | 1855 | 3 weeks. | 8 days. |
| Austria | „ | 1857 | No period specified.¶ | Not specified.†† |
| Belgium | „ | 1803 | 3 days. | Not specified: usu- ally 24 hours.†† |
| Bulgaria | „ | 1880 | 7 days. | Forthwith.†† |
| Czecho- Slovakia | „ | | | 2 days (since 1925). |
| Denmark | „ | 1687 | 2-8 days.** | No prescribed period.†† |
| France | „ | 1803 | 3 days. | Not specified: usu- ally 24 hours.†† |
| Germany | „ | Varies 1811-1876† | 7 days. | 24 hours. |
| Holland | „ | 1815 | 3 days. | 5 days. |
| Hungary | „ | 1895‡ | 7 days. | 1-2 days. |
| Italy | „ | 1863 | 5 days. | 24 hours. |
| Norway | „ | 1735 | Within one month.†† | Without delay.†† |
| Portugal | „ | 1886§ | One month. | Immediately.†† |
| Roumania | „ | 1866 | 3 days. | 24 hours. |
| Spain | „ | 1870 | 3 days. | 24 hours. |
| Sweden | „ | 1686 | 6 weeks. | None prescribed.†† |
| Switzerland | „ | 1874 | 3 days. | 2 days. |

* Not compulsory until 1875.

† *E.g.* Prussia 1874, Bavaria 1876, etc.

‡ Civil registration; prior to 1895 clergy responsible.

§ Not compulsory prior to 1911.

|| Prior to 1881 period was three weeks.

¶ For those births and deaths which must be declared to the *Civil* authorities, eight days.

** Towns, two days, rural areas, eight days.

†† Children of parents belonging to Established Church, at time of baptism; others within one month.

‡‡ In such cases little delay usually occurs, since burial cannot take place without written authority, which is withheld until registration is completed.

APPENDIX II.

Certification of Cause of Death.

| Country. | Legally (om- pulsory ? | Since ? | Certification by ? | Certificate open or sealed ? |
|----------------------|------------------------------|----------------------|---|--|
| England and Wales | Yes. | 1874 | Attending physician or coroner. | Old certificate. "Open," no "cause" on new certificate. ‡ |
| Ireland | " | 1880 | Attending physician. | Open. |
| Scotland | " | 1855 | Attending physician. | Open. |
| Austria | " | 1870 | Attending physician or official verifier. | Open. |
| Belgium | No. | — | — | Sealed where given. |
| Bulgaria | Yes. | — | Official medical verifier of death. | Open. |
| Czecho- Slovakia | " | 1870 | Attending physician, medical verifier or non-medical person. | Open. |
| Denmark | " | 1871 | Attending physician or official verifier. | Open. |
| France. | No.* | — | Official verifier of deaths. Certified fact of death. | Sealed. |
| Germany | Yes. | Varies, 1807-1924 | Varies, attending phy- sician, official ver- ifier, or declarant. | Custom varies. |
| Holland | " | 1865 | Attending physician. | Sealed. |
| Hungary | " | 1895 | Physician or non-medi- cal verifier. | Sealed. |
| Italy | " | 1907 | Attending physician or official verifier. | Sealed. |
| Norway | " | 1892 | Attending physician where possible. | Open. |
| Portugal | " | 1911 | Attending physician or official verifier. | Open. |
| Roumania | " | ? | Physician or declarant. | — |
| Spain | " | 1870 | Attending physician or health officer. | Open. |
| Sweden | Yes, in towns.† | — | Attending physician or official verifier. | Cause generally in- dicated by num- ber. |
| Switzerland | Yes. | 1874 | Attending physician. | Sealed. |

* Public Health Laws, 1902-3, demanded certification of cause when death is due to certain infectious diseases. Medical practitioners quote Article 378. Penal code when refusing to comply.

† And where possible in rural districts also.

‡ Physician certifies on certificate handed to informant, that certificate of cause of death *has* been completed: certificate of cause of death is, however, forwarded to local Registrar.

APPENDIX III.

Nomenclatures employed in Different Countries.

| Country. | List. |
|---------------------------|---|
| <i>England and Wales.</i> | Detailed and Abridged International Lists, adapted to meet national requirements. |
| <i>Austria.</i> | A special list of 25 causes. |
| <i>Belgium.</i> | The Abridged International List. |
| <i>Bulgaria.</i> | The Abridged International List. |
| <i>Czecho-Slovakia.</i> | Formerly two lists. Since 1925, International List adopted; causes tabulated in official publications by special short list of 58 causes. |
| <i>Denmark.</i> | 133 titles. Corresponding numbers in International List are added, but comparison is possible only in a few cases. |
| <i>France.</i> | Abridged International List. |
| <i>Germany.</i> | From 1905 a special list of 23 causes: Detailed International List to be introduced. |
| <i>Holland.</i> | Both Detailed and Abridged International Lists. Abridged list developed by additions to a special national list of 88 titles. |
| <i>Hungary.</i> | Special list of 27 causes for use of non-medical verifiers of death: detailed list of 179 causes for use of medical men. |
| <i>Italy.</i> | Until 1923 special list of 168 causes. Replaced in 1924 by a list of 221 titles. |
| <i>Norway.</i> | Special national nomenclature (131 titles). |
| <i>Portugal.</i> | Abridged International list. |
| <i>Spain.</i> | Abridged International list. |
| <i>Sweden.</i> | Special list, 101 titles under 71 headings. |
| <i>Switzerland.</i> | Up to 1920 deaths tabulated according to 23 titles. In 1921 more detailed list introduced. At ten-yearly periods, detailed statistics, 253 titles (latest 1911-20). |

APPENDIX IV.

*Some examples of the Various Rules followed in Tabulation **

(when more than one cause is recorded).

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| <i>England and Wales and Northern Ireland.</i> | The general order of preference in selection is— (i) <i>Violence.</i> Where any forms of violence and disease are jointly stated as a cause of death, the violence is to be preferred except in certain specified instances. (ii) <i>General Diseases.</i> Any general disease (certain specified exceptions) preferred to any local disease (certain exceptions). (General diseases, divided into four groups in order of importance. (iii) <i>Local Diseases.</i> A list is given, and from these selection is made in preference to any other local disease appearing in the same certificate. (iv) <i>Ill-defined Causes.</i> Deaths under this heading receive special attention; unsatisfactory descriptions are the subject of immediate enquiry. (For greater detail see the official <i>Manual</i> issued by the Registrar-General). |
| <i>Scotland.</i> | (i) <i>Violence</i> (certain specified exceptions). (ii) <i>Infectious Diseases</i> , except those having very low case mortality; e.g. Chicken-pox. |

* See also *Rapport sur les modes de Constatation des décès et de leurs causes.* M. Huber. XVI^e Session de l'Institut International de Statistique. Rome, 1925.

- (iii) *Diseases and Accidents of Pregnancy and Parturition.*
- (iv) *More Fatal Diseases; e.g. Cancer, Tubercle, Bright's Disease, etc. Pneumonia to be preferred to Bronchitis.*
- (v) *A Disease which is Primary to one which is Secondary.*
- (vi) *Acute Diseases are preferred to Chronic Diseases.*
- (vii) *A Disease named in the list of Causes of Death preferred to one not so named, but included in a general heading.*
- (viii) If none of the above preferences apply, cause named by the certifier as primary is selected.

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| <i>Austria.</i> | Tabulated according to the "Principal Malady" recorded. |
| <i>Denmark.</i> | When primary and secondary causes are recorded, primary cause generally selected, except in cases where such cause is not ordinarily fatal, when the secondary cause is selected. If more than two causes are recorded, the most serious disease is ordinarily chosen. If one of the causes is an infectious disease, this is chosen in preference to others. |
| <i>France.</i> | Where one cause is a complication of the other, the primary cause is selected, or in doubtful cases the most serious malady is tabulated. |
| <i>Germany.</i> | Generally speaking, the order of preference in selection is as follows : <i>Primary Cause</i> where two or more causes are recorded. In doubtful cases, the more serious malady. Where one cause is an <i>Infectious</i> disease, the latter is chosen in preference to others. If the certifying physician expressed a preferential opinion on the certificate, this cause is adopted. |
| <i>Holland.</i> | Only one cause of death appears on the certificate. |
| <i>Italy.</i> | <ul style="list-style-type: none"> (i) Where primary and secondary causes are recorded, the primary cause is selected provided no pathological law opposed such selection. (ii) When more than two causes are recorded, <i>e.g.</i> complications of the principal disease, the cause which is the most serious or has the gravest influence is selected. (iii) When one of the causes is an infectious disease the latter is selected. (iv) Even though the certifying physician definitely indicates what, in his opinion, is the principal cause of death, this is not necessarily accepted by the medico-statistical authority at the Central Statistical Bureau, who will classify according to the rules outlined above. |

APPENDIX V.

Transmission of Data.

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| <i>Austria.</i> | Quarterly summaries prepared by communal and provincial authorities on special schedules. |
| <i>Belgium.</i> | Annual, quinquennial, and decennial summaries prepared by communal authorities. |
| <i>Czecho-Slovakia.</i> | By the uniform system introduced in 1925, each registration area forwards at monthly intervals, direct to the Central Statistical Bureau, all individual death certificates. |
| <i>England and Wales.</i> | A weekly return of deaths is made in the case of London and the great towns. Registrars in other areas forward each month copies of all entries made in the Register of Deaths during the month. Medical certificates of causes of death are forwarded at quarterly intervals. All classifications are made at the office of the Registrar-General. |
| <i>France.</i> | Since 1923 local registrars required to forward at quarterly intervals to the Central Statistical Department, all individual bulletins completed in the period. |

- Germany.* Quarterly summaries prepared in each registration area, and forwarded together with individual bulletins to the superior office in the administrative area, where results for the whole area are prepared. These, in their turn, are forwarded to the Statistical or Health Bureau of the State concerned for tabulation. State tabulations forwarded to the Federal Statistical Office.
- Holland.* Medical certificates and individual death bulletins forwarded by communal authorities at monthly intervals to the Central Statistical Bureau, where all computations and classifications are made.
- Hungary.* Certifying physicians forward medical certificates direct to the Central Statistical Bureau. Individual death bulletins are forwarded at monthly intervals by local registrars to the Central Statistical Bureau.
- Italy.* Medical certificates and individual bulletins are forwarded by local authorities at quarterly intervals to the Central Statistical Bureau, where all computations and tabulations are made.
- Portugal.* Monthly summaries prepared by local registrars on printed schedules, and forwarded to superior district authorities, who, in their turn, forward such summaries to the Statistical Department of the Department of Health.
- Spain.* Individual death bulletins forwarded each month to Provincial Statistical Officers, where certain classifications are made, and summaries for the Provinces prepared. These summaries forwarded in their turn to the Central Statistical Bureau.

DISCUSSION ON MAJOR EDGE'S PAPER.

PROF. GREENWOOD: I think there was a time, a good many years ago, when some mathematical statisticians were a little contemptuous of the Society because we seemed to take more interest in the machinery of collecting and compiling statistics than in their algebraical manipulation. If that *were* a just reproach at any time, certainly it has lost its sting since the labours of Edgeworth, Professor Bowley and Mr. Yule, and that we still devote much attention to the machinery of compiling and publishing statistical data is a fortunate circumstance; Major Edge's paper contains historical illustrations of the Nemesis which awaits those who allow theory to outrun practice. Thus, he quotes the great Laplace's opinion that census taking is a difficult, tedious and unnecessary operation. It is hardly an exaggeration to say that the contributions made by Laplace and other Frenchmen of his generation to the theory of statistical mathematics were more important than those of the citizens of all other countries; it is not less true to say that the official vital statistics of France are much inferior to those of many countries whose citizens added but little to our knowledge of statistical theory. The intellectual vanity which led Condorcet to believe—to quote Todhunter—"that valuable results could be obtained from any data, however imperfect, by using formulæ with an adequate supply of signs of integration," is not so common,

perhaps, as in the days of Laplace; but the concluding passages of Major Edge's paper hint at the existence of another form of intellectual vanity almost as dangerous: the belief that official vital statisticians are in a position to adjudicate upon the correctness of the specifications of the causes of death assigned by certifying practitioners.

So far as the question of International Standardization is concerned, the moral I draw from Major Edge's researches is that, not by the imposition of grandiose schemes of classification and tabulation, but by agreement upon a few very simple principles, real progress will be made. Agreeing as I do with all that Major Edge has said, it would be wrong for me to stand between the meeting and those speakers who may have criticisms to put forward. I will only say that many Fellows must share my regret that our old friend and president, Sir Athelstane Baines, is no longer with us to discuss that subject which was his own, International Vital Statistics. I have great pleasure in moving that a hearty vote of thanks be accorded to Major Edge for his paper.

DR. STEVENSON: In rising to second this motion, as I do very heartily, I should like to express a certain feeling of gratitude to Major Edge on two accounts: first of all for presenting to us this exceedingly useful epitome of the results of his work in this domain for the last four or five years. It will be very valuable to us in the General Register Office as a permanent record where we may refresh our memories, as occasion may require, on the subjects dealt with. In the second place I also feel grateful to Major Edge in a connection referred to by the Chairman already—for letting us off so easily. I am sure he must have been tempted to say a number of cutting things in relation to the practice of the English Registration Office, but he has curbed that desire, and I feel gratitude on that score also.

Two or three points suggest themselves to me for comment. First of all, I was interested in what he gave us about the Swedish registration at the end of the seventeenth century, because I do feel that it is a matter of great regret that at that period vital statistics apparently took what I believe to be a wrong turning. We got into our present system of census records and registration records with no means of tracing the connection between the data presented in the numerical totals. I feel that the scheme which was epitomized by my late chief in his presidential address a few years ago contained possibilities of advance in our dealings with vital statistics which are contained in no other method, and it was of particular interest to me to see how nearly the pioneer country in vital statistics—Sweden—began on those lines.

The amount of information obtainable from mere census enumeration and registration summaries is very limited. If we want to get a little further on we have to try to get the relation between the facts collected; I might instance the question of occupational mortality, where we have to try, not always with complete success,

to relate two different sets of data—the deaths and the number of men in a given occupation. Now, if we had the system that Sir Bernard Mallet outlined, we should be in a position to answer a great many questions along these lines which we are not now in a position to deal with at all, and since he and I, some ten years ago, elaborated the scheme, I have been interested to watch how many of the applications made to our Office for information which we cannot supply, could or could not be met under that General Registration scheme, and I have not yet met with any that could not be met under it.

That is by the way, because we have not got it, and it is very hard to see when we shall have it.

The author of the paper refers to the form of certificate, and to our new form of certificate which came into use in this country a year ago. I should like to explain what is the object of that form of certificate. It is to elicit information as to cause of death in such a way as to put us in a position to trust the man by the bedside. For we do feel, on the point referred to by Major Edge in the concluding paragraph of his paper, that the results of determining above the certifier's head what his patient died from are artificial and intrinsically absurd. I cannot sit in an office in Somerset House and say that a patient certified as dying from measles died from smallpox, and yet if he dies in a smallpox hospital, that is what our present rules assume. The certifier may say that measles was the cause of death, but the overriding rule decides for smallpox.

Reference was made also to the difficulties of interpreting certain terms—"primary" and "secondary." We have done away altogether in our new form of certificate with the words "primary" and "secondary" for that very reason. We have been trying for many years past to explain to the profession in this country what we mean by "primary" and "secondary," but we have never succeeded in doing so. I used to think that really the certifiers were somewhat slow in not understanding what we meant until I came across the definition of the word "primary" in Gould's *Medical Dictionary*, where I found the primary cause of death defined as "that which operates last," and in view of so widespread an acceptance of that meaning of the term "primary" that it has got into a standard work of reference, I at once felt that I understood better than I had ever done before why there was misconception of these terms. I am pleased to find that our new form of certificate has been recommended for international use by the International Statistical Institute in its recent session at Cairo.

The salient points are that we ask for a distinction between related and unrelated causes, and we start at a definite point—the cause of death—and trace backwards to the more remote causes, instead of starting as we used to do at some indeterminate point in the past history of the case described as the primary cause of death and proceeding in the opposite order. But in recommending this form of certificate for international use, I am sorry to find that the Institute proposes to tighten up the code of regulations

for overriding the certifier's view as to the relative importance of the causes which he may mention, because it proposes to introduce a hard-and-fast tabular list of preferences to be applied in all countries. I sincerely hope we shall not put such a procedure as that into force. Our idea is to be able to get from the certifier so clear a statement of his view of the case that we shall be able with confidence to select the decisive cause as indicated by him, but at present so considerable a proportion of certifiers fail to use the new form as designed that we have for the moment to adhere to our old rules. We are, however, hoping, by means of methods for securing publicity and drawing attention to the importance of the subject, to arrive at a position where we shall be able to abandon those rules and to follow the opinion expressed upon the certificate.

I am a little suspicious of the extent of uniformity in regard to methods of census taking suggested in the paper, because it seems to me that we do want a certain amount of home rule as to method in these matters. Circumstances differ in different countries, and I think it is for each national office to determine how objects which, stated in general terms, are of common interest can best be attained in each particular case. The problem is not the same in every country.

One word as to confidential certification. I was very pleased to find in the paper how far confidential certification was already in use, because I had supposed it largely confined to Switzerland and Holland. I do feel that we must hope to see certification made confidential, and yet I think that it would be possible easily to exaggerate the degree of difference that confidential certification is going to produce. I suppose the two causes most affected are syphilis and alcohol, and I really doubt whether even with confidential certification we are going to get very near the real facts for either of those causes. So much depends upon the personal view. If one takes alcohol as an example, we know that certain enthusiasts for temperance are liable to ascribe a great many deaths to alcoholism as a primary cause which the average man would not think of associating with it at all; and in the case of syphilis, if we do get a great under-statement of the mortality really due to that cause, I think it may be quite as much due to the fact that the connection is not recognized by the certifier as to the fact that he is unable to put it down on the certificate. Indeed I am not sure that we should wish him to change his certificate from a disease which he can record as a matter of fact, say heart disease, to syphilis, because he thinks the heart disease was due to syphilis. That is a matter of opinion, and I think we should be chary of substituting a matter of opinion for one of fact.

I am amused by our present law in its bearing on this subject. It seems to me such a delightful example of the English characteristic recently referred to in another connection by the Dean of St. Paul's—the genius for reconciling logically opposed positions.

Under the new Act, if anybody comes to us and says that the friends (or insurance company) ought to know what the deceased

died from, we say, "Yes, they can pay one shilling and find out." Another person says that certification ought to be confidential, and we say that the certificate is jealously guarded from the eye of the relatives, and sent in a sealed envelope to the registrar. I think that a delightful example of this trait in the national character.

I have very much pleasure in seconding the Vote of Thanks to Major Edge.

SIR ALFRED WATSON, who was unfortunately prevented from attending the meeting, sent the following comments, which were read by Mr. P. G. Brown: Major Edge's paper serves the important purpose of stimulating our thoughts as to the *desiderata* of a perfect registration system. The needs both of the administrator and the statistician are manifold, but in this Society it is natural to confine our attention, more or less, to statistical purposes, to which only I propose accordingly to refer. The paper naturally separates census taking from the civil registration of the events of birth and death, but statistically they are brought together in the computation of rates or proportions and cannot be discussed entirely apart from each other. Statistical records were for a long time regarded as having two aspects, the medical and the sociological—both of great if unequal importance; but from the days of Dr. Farr a third purpose of great utility—what may be called the commercial purpose—has been served by the resultant of the census and the death records known as the English Life Tables. Assuredly this is not the only purpose which the National Life Tables have promoted, but in providing the financial basis of a gigantic system of Industrial Life Assurance and supplying the means of measuring the liabilities under contracts which have now grown to the enormous number of 72 millions they have achieved a measure of direct utility which seldom falls to the lot of Government publications. I notice a recent tendency to deprecate the continuance of the "life-table" form of exhibiting the vitality of the people. As regards abstract considerations there is much to be said on both sides of this question, but the critic must concede that commercial purposes have a claim for attention which must be allowed its proper weight.

In recent years a fourth claimant for statistical assistance from official sources has made an appearance in the shape of social insurance. The needs of this applicant for a due share of the favours of the registration departments vary from country to country with the national conception of the finance of a soundly based scheme. Only perhaps in Great Britain, where the system as a whole is more widely developed than elsewhere, is it regarded as necessary to justify the contributions, and under some heads to control the accumulation of reserves, by reference to actuarial considerations; and it is probable that only in this country, therefore, do the schemes as yet require any comprehensive help from the system of vital registration. A coming system of Widows' and Orphans' Pensions prompted, for instance, the dependency statistics which were an important feature of the last census. Material of this kind, and

in such volume, was obviously of the greatest value in forecasting the cost of the scheme then in course of incubation. Sociologists have naturally uttered some lament that the space on the census schedule devoted to this purpose was obtained by dropping the question as to fertility which appeared on the 1911 census form, and of the replies to which Dr. Stevenson afterwards made the excellent statistical use which is known to all of us. But here was a clear case of preferring a concrete necessity to abstract issues, and it must, at any rate, afford some consolation to those who favoured the repetition of the inquiry into fertility to know that the dependency statistics did, in fact, give the means of approximating closely to the current birth-rates with reference to age of father and of mother, and of both in combination, with a good deal of other information; for example, occupational distribution of families bearing on the same topic of enquiry. It is too soon to say how far the needs of social insurance will always require dependency statistics to be obtained, but it is difficult to believe that in present industrial conditions such information can be dispensed with as an instrument of knowledge in public administration. In connection, for example, with questions such as wage rates and transference of surplus labour, the means of classifying the workers in a given industry or locality with reference to family responsibilities would seem to be too valuable an aid to possible needs of the State to be lightly given up.

Consideration of the system of death registration—and this not entirely from the point of view of the needs of State insurance—compels reflections as to whether in this direction we have got the best that is attainable. The occupation of the deceased must be stated, but not his marital status, and while by a little artifice, apparently, the occupational enquiry suffices to elicit whether a woman whose death is registered was married or otherwise, no corresponding information is obtainable in the case of men. This is in England and Wales. Scotland is ahead of us in this respect, and the Registrar-General for Scotland has been able, in an unofficial publication, to give us the death-rates, with reference to age, for married and unmarried men as separate classes of the community. For the new purposes to which I have referred such information is much needed in England and Wales also, and why the simple facts as to the marital status of a deceased man should not be deemed as worthy of record is beyond my understanding. I would not ask for the massive array of facts in regard to ages of wife and children that New Zealand, for example, exacts from those who must attend to perform the simple civic duty of registering a death. Useful as I have found the resulting statistics for certain purposes, I should feel that reliability would not be a concomitant of similar details obtained from the same sources in this country. The mere requisition of such information may indeed be held to be more than the State can justify to its subjects: even a passion for collecting facts should be kept within due bounds. It is certainly no surprise that some seventy years ago Scotland had to beat a hasty retreat from

an elaborate experiment in registrational inquisition. But remembering this useful lesson, it is surely possible to find a middle course by which our statistical deficiencies on a socially important range of facts would be diminished.

SIR BERNARD MALLET thought that anything he might have said had already been anticipated by Dr. Stevenson. The account given of the conditions surveyed by the speaker rather filled with despair anyone like himself, who was interested in the question of the scientific investigation of population problems, because that investigation must depend upon the best possible statistics that could be obtained—vital statistics from all civilized countries at least, as far as possible on a comparable basis. That was the first essential. From all Sir Bernard had heard that evening and elsewhere, the British system of vital statistics still appeared to be the best in the world. When he was Registrar-General, however, he had a great list of defects which he brought before the Society and which it was not possible to remedy in the antiquated state of the registration law, and he supposed most of those defects still remained for the same reason. Even upon the burning question of the differential birth-rate we were still without some information essential to form a sound opinion, as Dr. Stevenson's recent paper had indicated.

It was disheartening to observe how little the International Statistical Institute and the League of Nations had been able to effect in these matters. It remained to be seen whether the proposed new Population Union would be able to put more spirit into the matter.

Dr. Stevenson had alluded to one of the most obvious ways of improving vital statistics and the census, which was by means of a General Registration system, such as Dr. Stevenson and Sir Bernard had great hopes of ten years ago. Sir Bernard hoped he would be pardoned for thinking that the arguments then put forward were unanswerable; they were certainly not answered, because their report on the subject never saw the light at all.

SIR WILLIAM HAMER said he was very glad to have an opportunity of thanking Major Edge for a paper to which he had listened with the greatest interest. There were two points he had intended to mention, and they had already been referred to by the proposer and seconder of the Vote of Thanks.

With regard to confidential certification, Sir William Hamer agreed with Dr. Stevenson that not much, if anything, was to be gained by alteration there. So far as cancer was concerned, there could be little doubt that practitioners of a past generation took a somewhat different view from the view taken now. He remembered hearing a most eminent authority discussing the question of confidential certificates in a lecture forty years ago, and the advice then given—which was presumably the generally accepted advice of that day and generation—was not to be too ready to enter

"cancer" upon death certificates. There had presumably been a change of attitude, and that change possibly in large measure accounted for the apparent increase in the death-rate from cancer. He agreed with Dr. Stevenson that they were not going to secure any great benefit by trying now to make the certificate confidential.

The second point, which had been made by Professor Greenwood, was, he believed, an exceedingly important one—the question of relying upon the certifying practitioner. Dr. Stevenson had referred to the elimination of the words "primary" and "secondary" on the death certificate, and this, of course, was a great gain, but he wondered whether perhaps by introduction of the words, "Morbid conditions if any, giving rise to immediate cause, stated in order proceeding backwards from immediate cause," they had not perhaps jumped from the frying-pan into the fire. He might illustrate the nature of the difficulty which he felt by taking a disease like "Influenza"; if one were filling in a death certificate, how would one be likely to fare in such a case? In the great influenza wave that the country had just passed through, there was, during the four or five years of exceptional mortality, an excess of 5 to 10 per cent. above the normal death-rate. If British India was considered, the Ministry of Health Report said that during the two years 1918 and 1919 there was something like three or four times that excess of deaths, and this excess was attributed entirely to influenza. If one turned to European Russia, where there was an excess of nearly the same high order, during the great influenzal cycle of years something like twelve million cases were ascribed to typhus and relapsing fever. Thus when East and West are subjected to like epidemic influences, the phenomena are described (speaking from a nomenclature point of view) in widely differing ways. Here, and in America and elsewhere, there was even talk of "new diseases." Russia called many millions of the cases "typhus" or "relapsing fever": it was left to British India to tell the truth, the whole truth, and nothing but the truth. Creighton said, "Influenza can be identified as certainly in the brief phrases of mediæval chronicles, as in elaborate modern descriptions"; and it might be added, as certainly, indeed much more certainly, in countries without, than in countries with, perfected registration systems. One was almost tempted to draw the moral that it was imperatively necessary to stress "scientific emphasis on strict observation, to rely upon the doctor who sees the case, and to give careful heed to the injunction 'Don't speak to the man at the wheel.'"

MR. S. P. VIVIAN thanked Major Edge for his valuable paper. He felt sure that those who were familiar with the useful series of Statistical Handbooks for various countries, issued by the League of Nations, in the preparation of which Major Edge had taken no small part, would welcome his supplementing of the information already given. Mr. Vivian agreed with previous speakers that this paper of Major Edge's would furnish a valuable record to which

reference could in future be made. From that point of view, and in order that no whit of its usefulness might be lost, Mr. Vivian said he would like to draw attention to one or two minor points which Major Edge might consider at leisure.

Reference was made in the paper to the Scottish census of 1755 as official. Major Edge might consider whether this was the case; Mr. Vivian's recollection was that it was not, but that it was the work of a private investigator working through a semi-private charitable institution. This census, of which Mr. Vivian had a copy, was very interesting. Fighting men were calculated proportionately, with the result that a particular parish might be returned as containing, say, fifty fighting men and a half. Another point which Major Edge might consider was as to whether some of the references to birth and death registration should not have rather referred to baptisms and burials.

There was another point on which Mr. Vivian had experienced some little disappointment. Registration systems, so far as he was aware, had seldom, if ever, been founded solely for the purpose of providing statistical material. Their primary object was to provide a record of the civil condition of the individual for legal and semi-legal purposes—to prove legitimacy, succession, and so on—and that primary object had, of course, naturally coloured and determined the form and organization of the system. The statistical product was incidental; and while those responsible for administering registration systems naturally did their best to adapt them to furnish the best statistical product, the answer, very often, to criticisms as to the inability of a registration system to satisfy any particular statistical demand was that the system was originally framed, and had to be maintained, to serve a primary purpose of an entirely different character.

It was, of course, natural that Major Edge should have limited himself to the statistical product, but Mr. Vivian would have liked Major Edge to have discussed the various registration systems in Europe from the point of view of their primary functions, because in discussing the differences between particular systems in various countries it was impossible to appreciate the reasons for those differences without an examination of the purposes which they were created to serve. For example, there was one difference of principle of an extremely interesting kind. In this country there was an independent isolated record of each birth, marriage or death; and interested persons had themselves to prove that any two such records related to the same individual. In some European countries Mr. Vivian had always understood that there was a system by which all the events affecting a particular individual found their way to a single record and were associated there, a system which, incidentally, had certain reactions of a statistical character. Major Edge's researches must have thrown a great deal of light upon what actually happened in other countries in this connection. Mr. Vivian himself felt a good deal of scepticism as to the practicability, in any industrially developed country, of successfully associating all

the events relating to a particular individual. There must be great difficulty in establishing the identity; and even if that appeared to have been overcome, he suspected that it must have been largely at the cost of accepting untrue statements, resulting in an unreliable record. Mr. Vivian said he would have liked to have had the benefit of Major Edge's researches on this particular question and that aspect of the comparative study of registration systems; although he realized that in view of the abundant material supplied in the paper, it was somewhat ungracious to ask for more.

MR. G. FINDLAY SHIRRAS said that it was with much pleasure that he endorsed the remarks of Dr. Greenwood and Dr. Stevenson. He ventured, however, to make one or two criticisms, especially with regard to the earlier part of the paper. The writer had called his paper "Vital Registration in Europe: the Development of Official Statistics and some Differences in Practice." In paragraph (1) he said that he attempted to "give a short account of the development of official statistics in various European countries, and to call attention to some of the existing differences in continental practice." Now, had the author succeeded in what he set out to do? Should he not have termed his paper "Some Historical Factors connected with European Censuses and Vital Statistics"? From the title of the paper one would have expected the author to deal with census taking in one or more countries, and brought out what Adam Smith would have called the connecting principles, both in the development of census taking in England and, say, Germany, if not "in various European countries," and also the main differences in the censuses of various European countries to-day. To use Professor Greenwood's expression, "an agreement on simple processes that could be carried out" would have been invaluable. Giffen, that great statistician, was never tired of stressing the importance of forms, which were of the highest value to the statistician, and of emphasizing the importance of what the statistical forms in use in different countries showed. He himself was one of those who followed Giffen in ascribing this importance to the form, especially in the taking of a census, where it was necessary to get the maximum amount of information in the minimum of space.

Time did not permit a lengthy illustration of this point, but he would briefly refer to the importance of examining the changes in the taking of a census in, say, England, from 1801 onwards. A careful study of this brought out certain important principles. It was not necessary here to deal with the vagueness and imperfection of the records in the United Kingdom up to the end of the eighteenth century, nor with the violent opposition to the taking of a census which was made in the House of Commons in 1753, when members declared that a census was "subversive of the last remains of English liberty and likely to be productive of some public misfortune or epidemical distemper"; nor need one refer to the importance of Malthus' essay on "Population," which by 1800 dissipated the dread of a decline in population, and the passing of a Bill in

1800 for the first census. Statisticians were rather concerned with the machinery, scope and classification. The first four censuses were imperfect, and the author of the paper might have shown why this was so. There was no real central authority, and the enumeration was taken by the overseers of the parish with the assistance of the parish ministers and the co-operation of the justices of the peace. He might have shown how the scope of the first census was limited to the number of persons and houses in each parish and a very simple classification of occupation, and how above everything else there was a great lack of uniformity in the interpretation of census questions; or he might have shown how, in 1821, an age classification was introduced, and, in 1831, the place of birth, and also the effect of two important Acts of Parliament—the Poor Law of 1834 and the Registration Act of 1836, the latter Act instituting the District Superintendent Registrars as official recorders of births and deaths. After 1838 the natural growth of population was traceable by a comparison of the birth and death rate.

It would have been interesting, too, to have viewed the work of Rickman, Farr and Ogle, and to have traced it up to the time of Sir Bernard Mallet and Dr. Stevenson. Admirable work had been done of recent years by the statisticians in the Office of the Registrar-General at Somerset House. Similarities with advanced or backward European countries in census taking would have been very useful.

General features common to the censuses and vital statistics of the greater European countries from the severely statistical point of view would have been very valuable. For example, no one could examine vital statistics in modern Europe to-day without being struck by the death-rate in urban areas as compared with the death-rate in rural areas, and much work of a comparative nature remained to be done in this respect. In England before the war the death-rate in urban areas was 50 per cent. greater than in rural districts, and in recent years this gap had decreased. How far was this noticeable in the censuses of other countries? Was the expectation of life greater in the country than in the town in Eastern European countries? Some interesting statistics had been given in an interesting publication, *Britain's Industrial Future*, to show how much greater the infantile mortality rate, the death-rate, and the tuberculosis death-rate were in Shoreditch, Bermondsey and Poplar than in Hampstead and Lewisham. Figures for Glasgow quoted from the résumé of work of the Public Health Department Corporation of Glasgow 1926-7 bore out the same thing. Then, again, was there a class correlation between the rate of infant mortality and the size of the family? How far did Sundbärg's age categories fit in with the population of the main European countries? Sundbärg found that half the population was contained in the category from fifteen to fifty and remained steady, while the fluctuations of the numbers in the young and old categories respectively indicated the stationary or progressive nature of the population. The typical groupings were as follows:—

| Type. | Proportion per 1000 of the population of different countries in certain age periods. | | |
|--------------------|---|--------|--------------|
| | 0-15. | 15-50. | 50 and over. |
| Typical: | | | |
| Progressive | 400 | 500 | 100 |
| Stationary | 330 | 500 | 170 |
| Regressive | 200 | 500 | 300 |

There was also the question of age distribution. In some countries—for example, India—there had been a substantial decline in the ratio of females to males in the natural population since 1891. There were only 933 females per thousand males in India, and in the Punjab it was as low as 906, and in the North-West Frontier provinces, 805. The Dravidian and Mongolian races in India had a higher proportion of females born than the Aryan or Semitic races in the North and North-West India. How was it that there had been a rise in the masculinity in recent years? Were there any reasons for this in Europe? Were there differences between various countries? In India it was usually explained that the absence of famine mortality, which selected adversely to males, and the heavy mortality from plague and influenza—the mortality from influenza alone in 1918-19 was approximately between 12 and 13 millions for India—which selected adversely to females, were the causes. A study of European official census statistics would have been of interest in this connection. The deficiency of females at birth was a universal phenomenon in every population, it was said, and an examination of this, especially in the eastern countries of Europe, would have been of much interest. The age distribution too was of interest. It is interesting to note that in India, where marriage is universal, females do not understate their age. It is only widowers anxious to secure young wives who do this. In short, it would have been highly instructive had the author of this interesting paper been able to show the connecting principles underlying the main censuses (*a*) in regard to the statistical form of the censuses themselves, and (*b*) in regard to the main features, only a few of which Mr. Findlay Shirras had had time to refer to in passing.

Another criticism was the absence of a reference to the two great censuses in the world at the present time—the census of India and the census of the United States. Both these were triumphs in census taking. It was of course true that Major Edge had indicated that he had omitted discussion of these on purpose either by way of comparison or otherwise, although he did refer at the beginning of his paper to the Chinese authorities in 1711. Those who had been privileged to study the taking of the American census and the work done in the Bureau of Census in Washington could not but envy the methods followed in the great Republic. In India the

work done in the last five quinquennial censuses had been dealt with by Sir Athelstane Baines and other Fellows of the Society. The principles governing the taking of a census of this nature were of considerable importance, as the population was 319 millions and mainly illiterate. As was well known, the census was usually taken in March, and the chief considerations deciding the fixing of the date were, firstly, that the date should be as nearly as possible the exact decennial anniversary of the previous census: secondly, that there should be moonlight between 7 p.m. and midnight, when the enumerators made their verification of the schedules, and, thirdly, that occasions of large fairs or similar gatherings which would disturb the normal distribution of the population should be avoided. In each province and native state the census was controlled by a special officer who followed the general instructions of the census code issued by the Census Commissioner. The district was the main unit and it was divided into charges, circles and blocks, the block being the ultimate sphere of the enumerator, and consisting usually of between thirty and forty houses. The Land Record Staff and the village schoolmasters supplied the most efficient part of the subordinate Census Staff. The Staff was carefully instructed some months before the census, and a preliminary enumeration was held three or four weeks before the census date, in which all the schedules were written out for the population then found in the blocks. The immobile character of the population ensured a very high standard of accuracy. Special steps were adopted for populations located under abnormal conditions, *e.g.* in transit, cantonments, fairs, camps, gaols, etc. In the last (1921) census the returns of a population amounting to 123 millions were received within four days, and in a very short time the figures for the whole of India were published. The difference between the provisional total and the final total obtained after an elaborate compilation amounted to .04 per cent. for the whole of India.

Then, again, there were the vital statistics, which were notoriously incomplete in some parts of Europe, as they were in India, where, in rural areas, the omissions in the record of *numbers* varied up to about 20 per cent. The record of births was normally less accurate than that of deaths. In urban areas the standard of accuracy varied with the standard of the administration. The records of the causes of mortality were defective, especially in regard to fever. Age categories outside a certain limit were guess-work. Vital statistical records were established throughout British India except in the more remote and backward tracts, and the population covered was about 241 millions, or about three-quarters of the population of India, and the system was ordinarily based on the village. The Headman of the village recorded the data and passed them on periodically to some local authority, usually the Police, by whom records were kept. Extracts were sent to the local officer responsible for the records of public health, who compiled them for the district. From the district totals the provincial totals were compiled. The information gave births, including stillbirths, and deaths, by sex

and religion, and the classification of the deaths under certain categories of age and disease.

It would have been interesting to have seen how in the more backward tracts, especially of Eastern Europe, the system of compilation worked. In this connection he would like to refer to the report of the Committee of which Professor Willcox of Cornell University was *rapporteur* at the meeting of the International Institute of Statistics which took place last year at Cairo. The necessity of undertaking the proper collection of vital statistics in sparsely populated areas is often recognized, but until recently the International Institute had not laid down any general principles. These principles are of great importance, and it would have been interesting to have heard something of the principle underlying the collection of such statistics in Europe.

In conclusion, Mr. Shirras desired to thank the lecturer again for this masterly paper, and to acknowledge and pay tribute to the work of his old friend, Sir Athelstane Baines, to whom Professor Greenwood had referred.

In conclusion he would like, as an overseas representative, to say how much the Fellows of the Society appreciated the honour which had recently been conferred on Professor Greenwood—Fellowship of the Royal Society. The Royal Society, in honouring Dr. Greenwood, as it did some time ago Mr. Udny Yule, had indeed honoured the Royal Statistical Society.

MR. MACDOUGALL said that although he was not a Fellow of the Society he would like to point out that in Scotland in early times it would have been impossible to have what was termed an official census. The population was divided into clans, and the word clan meant "family," or blood relationship. The chief of each clan had his census taken and records were kept by each clan and in each district. Mr. MacDougall's own clan, for example, in the early days took the whole of the West of Scotland all the way down, and the lists were kept. Records existed for very early periods indeed, up to Bruce's time and about that period, but they were not perfect, and he would not like to say that it would be possible to get a complete census of Scotland. In early days it was impossible to have what was recognized as an official census, but there was a clan census, and each chief knew the numbers of his clan. The earliest records were kept on notched sticks or tallies such as were used for recording the correct number of threads in each stripe of the tartan, which were known as "sets."

MR. A. W. FLUX said that at this late hour he did not feel justified in attempting to speak upon a subject which lay outside the field that he particularly cultivated, but he would attempt to make one observation in view, particularly, of the drift of the remarks—with which he wholly and cordially sympathized—which his colleague, Dr. Greenwood, had made at the beginning of the discussion. He read, in the last paragraph of the paper, that sometimes enthusiastic

official statisticians sought to get more from statistical returns than those returns could fairly be expected to yield. Possibly, having been an outside statistician and critic of the officials, and having also for some time been an official statistician himself, he might be affected by the later of his functions, but it had always seemed to him that the outside statistician was trying to get more from the official statistics than the inside man was prepared to admit was in them. He would like to place that view on record, and particularly to emphasize what Professor Greenwood had said so well about the impossibility of extracting even by the most elaborate mathematical processes sound results from bad statistics. That was one of the morals arising clearly and distinctly from the paper.

Mr. Flux said he would like to add his appreciation of what Major Edge had done for the cause of statistics.

MAJOR EDGE, replying, said: I should like to try and thank you for the very kind reception you have accorded to my paper, and to try to say how much I appreciate the kind things that the proposer and seconder, and all the other speakers, have said about the paper. I am in full agreement with the criticisms of Mr. Vivian and Dr. Stevenson; I would only ask them to take into consideration these facts: that in preparing this paper the big difficulty was to know what could be left out in order to keep the paper within reasonable limits; in fact many of the points suggested by them would have required a paper to themselves. I did not feel I had the ability to write a really big paper.

As a result of the ballot taken during the meeting, the candidates named below were elected Fellows of the Society:—

Agnes May Brand.
George Douglas Howard Cole.
Jessie Iris Douglas.
Sydney Montague Jacob.

Charles Henry Martin.
John Ryan.
William Millar Smith.

WHOLESALE PRICES OF COMMODITIES IN 1927.

By THE EDITOR OF THE "STATIST."

(The *Statist's* Index-Numbers, in continuation of Mr. A. Sauerbeck's figures.)

THE following table of index-numbers compiled to the end of 1912 by Mr. Augustus Sauerbeck, and subsequently by the *Statist*, shows the course of wholesale prices of forty-five commodities during the last twenty-one years as compared with the standard period of eleven years, 1867—77, which in the aggregate is equivalent to the average of the twenty-five years 1853—77 (see the *Journal*, 1886, pp. 592 and 648, and 1893, pp. 220 and 247). There are added corresponding data for 1896, the year of lowest prices, and for 1873, just after the Franco-Prussian War.

Summary of Index-Numbers. Groups of Articles, 1867—77 = 100.

| | Vegetable Food (Corn, etc.). | Animal Food (Meat, etc.). | Sugar, Coffee, and Tea. | Total Food. | Minerals. | Textiles. | Smelteries. | Total Materials. | Grand Total. | Silver. | Wheat Harvest. | Average Price of Consols. | Average Bank of England Rate. |
|-----------|------------------------------|---------------------------|-------------------------|-------------|-----------|-----------|-------------|------------------|--------------|---------|----------------|---------------------------|-------------------------------|
| | | | | | | | | | | | | £ | Percent. |
| 1873..... | 106 | 109 | 106 | 107 | 141 | 103 | 106 | 114 | 111 | 97.4 | 80 | 92½ | 4.750 |
| 1896..... | 53 | 73 | 59 | 62 | 63 | 54 | 63 | 60 | 61 | 50.5 | 112 | 110¾ | 2.483 |
| 1907..... | 69 | 88 | 48 | 72 | 107 | 77 | 78 | 86 | 80 | 49.6 | 113 | 84½ | 4.925 |
| '08..... | 70 | 89 | 48 | 72 | 89 | 62 | 73 | 74 | 73 | 40.1 | 108 | 86½ | 3.013 |
| '09..... | 71 | 89 | 50 | 73 | 86 | 64 | 76 | 75 | 74 | 38.9 | 113 | 83½ | 3.083 |
| '10..... | 65 | 96 | 54 | 74 | 89 | 73 | 81 | 81 | 78 | 40.5 | 102 | 81½ | 3.725 |
| '11..... | 70 | 90 | 61 | 75 | 93 | 76 | 81 | 83 | 80 | 40.4 | 110 | 79½ | 3.467 |
| 1912..... | 78 | 96 | 62 | 81 | 110 | 76 | 82 | 88 | 85 | 46.1 | 97 | 78½ | 3.776 |
| '13..... | 69 | 99 | 54 | 77 | 111 | 84 | 83 | 91 | 85 | 45.3 | 105 | 73½ | 4.771 |
| '14..... | 75 | 100 | 58 | 81 | 99 | 81 | 87 | 88 | 85 | 41.6 | 109 | 72½ | 4.088 |
| '15..... | 108 | 126 | 70 | 170 | 126 | 92 | 109 | 108 | 108 | 38.9 | 106 | 65½ | 5.000 |
| '16..... | 133 | 152 | 86 | 130 | 158 | 129 | 136 | 140 | 136 | 50.4 | 97 | 58½ | 5.470 |
| 1917..... | 177 | 192 | 113 | 169 | 172 | 192 | 174 | 179 | 175 | 65.8 | 102 | 54½ | 5.15 |
| '18..... | 168 | 207 | 130 | 174 | 192 | 222 | 202 | 206 | 192 | 76.4 | 111 | 56½ | 5.0 |
| '19..... | 179 | 213 | 147 | 185 | 220 | 228 | 219 | 222 | 206 | 85.3 | 98 | 54½ | 5.166 |
| '20..... | 227 | 263 | 198 | 234 | 295 | 262 | 244 | 264 | 251 | 76.1 | 96 | 47½ | 6.71 |
| '21..... | 143 | 218 | 83 | 158 | 181 | 140 | 145 | 153 | 155 | 48.1 | 118 | 47½ | 6.092 |
| 1922..... | 107 | 184 | 82 | 130 | 142 | 134 | 124 | 132 | 131 | 51.6 | 105 | 56½ | 3.692 |
| '23..... | 98 | 162 | 101 | 122 | 155 | 140 | 117 | 134 | 129 | 49.4 | 105 | 57½ | 3.496 |
| '24..... | 119 | 158 | 105 | 130 | 158 | 170 | 120 | 146 | 139 | 50.7 | 107 | 56½ | 4.0 |
| '25..... | 118 | 162 | 89 | 128 | 154 | 165 | 119 | 143 | 136 | 52.5 | 114 | 56½ | 4.575 |
| '26..... | 108 | 150 | 88 | 119 | 154 | 133 | 114 | 131 | 126 | 47.1 | 99 | 54½ | 5.0 |
| 1927..... | 108 | 138 | 83 | 114 | 141 | 131 | 118 | 129 | 122 | 42.8 | 109 | 54½ | 4.650 |
| Average | | | | | | | | | | | | | |
| 1904-13 | 68 | 91 | 53 | 73 | 95 | 74 | 76 | 81 | 77 | 44.1 | 106 | 82½ | 3.733 |
| 1890-99 | 61 | 80 | 63 | 68 | 71 | 56 | 66 | 64 | 66 | 55.8 | 103 | 103½ | 2.958 |
| '78-87 | 79 | 95 | 76 | 84 | 73 | 71 | 81 | 76 | 79 | 82.1 | 97 | 99½ | 3.264 |
| '18-27 | 109 | 90 | 151 | 111 | 128 | 105 | 106 | 112 | 111 | 98.0 | — | — | 3.692 |

* Silver 60.84d. (see note on p. 401) per oz., being the parity of 1 gold to 15½ silver = 100.

† Wheat harvest in U.K. to 1895: 29 bushels = 100; from 1896: 30 bushels = 100.

‡ Average price of Consols and the average Bank of England rate of discount are actual figures, not index-numbers; Consols 3½% to 1888, 2½% from 1889, 2½% from April, 1903.

The all-commodities index-number for 1927 (based with a very few exceptions on the average of 52 weekly quotations for each commodity) is 122, showing a fall for the third successive year. The figure for 1927 represents the lowest level of prices touched since the year 1915; it indicates a fall of 3·2 per cent. in wholesale prices compared with the average for 1926. It is 43·6 per cent. above the average in 1913, 51·4 per cent. below that for 1920, the year of highest prices, and exactly 100 per cent. above that for 1896, the year of lowest prices.

The complete series of annual all-commodities index-numbers is shown below. The table records the Sauerbeck-*Statist* index-numbers from 1846, *i.e.* from the commencement of the calculations together with Jevons' figures adjusted to Mr. A. Sauerbeck's standard for the years 1809, 1810 and 1818.

The Statist's Annual Index-Numbers (in continuation of Sauerbeck's figures).

| Year. | Average No. | Year. | Average No. | Year. | Average No. | Year. | Average No. | Year. | Average No. |
|-------|-------------|-------|-------------|-------|-------------|-------|-------------|-------|-------------|
| 1927 | 122 | 1910 | 78 | 1893 | 68 | 1876 | 95 | 1859 | 94 |
| '26 | 126 | 1909 | 74 | '92 | 68 | '75 | 96 | '58 | 91 |
| '25 | 136 | '08 | 73 | '91 | 72 | '74 | 102 | '57 | 105 |
| '24 | 139 | '07 | 80 | '90 | 72 | '73 | 111 | '56 | 101 |
| '23 | 129 | '06 | 77 | 1889 | 72 | '72 | 109 | '55 | 101 |
| '22 | 131 | '05 | 72 | '88 | 70 | '71 | 100 | '54 | 102 |
| '21 | 155 | '04 | 70 | '87 | 68 | '70 | 96 | '53 | 95 |
| '20 | 251 | '03 | 69 | '86 | 69 | 1869 | 98 | '52 | 78 |
| 1919 | 206 | '02 | 69 | '85 | 72 | '68 | 99 | '51 | 75 |
| '18 | 192 | '01 | 70 | '84 | 76 | '67 | 100 | '50 | 77 |
| '17 | 175 | '00 | 75 | '83 | 82 | '66 | 102 | 1849 | 74 |
| '16 | 136 | 1899 | 68 | '82 | 84 | '65 | 101 | '48 | 78 |
| '15 | 108 | '98 | 64 | '81 | 85 | '64 | 105 | '47 | 95 |
| '14 | 85 | '97 | 62 | '80 | 88 | '63 | 103 | '46 | 89 |
| '13 | 85 | '96 | 61 | 1879 | 83 | '62 | 101 | '18 | 159* |
| '12 | 85 | '95 | 62 | '78 | 87 | '61 | 98 | '10 | 171* |
| '11 | 80 | '94 | 63 | '77 | 94 | '60 | 99 | '09 | 189* |

* Jevons' numbers adjusted.

The fall in sterling prices which set in at the beginning of 1925 and continued with temporary set-backs during that and the ensuing year made further progress during 1927. The broad downward curve indicated by the four latest yearly averages reflects at its inception the thrusting down of sterling prices that was required by the policy of re-establishing the gold standard in this country without having recourse to the process of devaluation. The Exchange value of sterling returned to parity with gold in the spring of 1925. The adjustment of sterling prices to the appreciated Exchange value of

the currency had by no means been completed when the legal return to gold convertibility was effected, and the fall in sterling prices over the ensuing three years has been considerably greater than the falls that have occurred in other "gold" price levels during the same period.

Changes in sterling prices were of somewhat indeterminate character over the first half of the year. There had been a fall of 5·3 per cent. during December, 1926, a movement of abnormal character, due mainly to the reduction in the high (nominal) prices for coal consequent on the recommencement of mining after the strike. This reduction was further accentuated during January, prices over this month falling by 0·6 per cent. A recovery took place in February, but proved no more than a temporary reaction followed by two further months of falling prices. A rise of 0·4 per cent. took place during May, but was followed in June by a fall which took prices back to the level at which they stood at the end of January. Apart from a slight recovery in August, the downward trend in prices continued until the end of October, when an index-number of 120·6 was recorded, this being the lowest figure since December, 1915. In November there was a recovery to 121·5, and the figure for the end of the year was 121·4. The fall in prices over 1927 amounted to 2·0 per cent. The highest monthly index-number was 124 at the end of February, the lowest 120·6 at the end of October. The range of price fluctuations over the year was 2·9 per cent., this being the narrowest range of fluctuations experienced since the year 1910.

The net decline of 2·0 per cent. in the all-commodities monthly index-numbers over 1927 is the outcome of comparatively wider fluctuations in the index-numbers of the individual groups of commodities. On balance there was a fall of 5·8 per cent. in foodstuffs, while materials rose by 0·6 per cent. Among materials, minerals declined by 18·4 per cent., textiles rose by 17·7 per cent, and sundries by 5·0 per cent. In the Foodstuffs group, vegetable foods declined by 2·8 per cent., animal foods by 7·6 per cent. and sugar, tea and coffee by 7·8 per cent.

A record of the fluctuations in the monthly group and final index-numbers since the commencement of 1925 is afforded by the table on p. 397.

Some remarkably wide fluctuations occurred in the prices of individual commodities over the year 1927. Among foodstuffs, the more important were falls from 51s. 1d. to 42s. 2d. per quarter of English wheat; from 155s. to 120s. per ton of potatoes, from 100d. to 86d. per 8 lb. of pork, from 122s. to 88s. per cwt. of Waterford bacon. The only substantial advance in foodstuffs price was the rise 28s. 9d. to 35s. 3d. per quarter of La Plata maize.

Monthly Index-Numbers of Wholesale Prices of Commodities.

January, 1925—February, 1928.

| | Vegetable Food. | Animal Food. | Sugar, Tea, and Coffee. | Food Stuffs. | Minerals. | Textiles. | Sundry Materials. | Materials. | All Commodities. |
|--------------|-----------------|--------------|-------------------------|--------------|-----------|-----------|-------------------|------------|------------------|
| 1925. | | | | | | | | | |
| Jan. ... | 137.4 | 160.3 | 103.0 | 133.6 | 159.8 | 173.0 | 125.4 | 149.3 | 144.8 |
| Feb. ... | 129.3 | 165.3 | 98.6 | 136.1 | 158.6 | 172.6 | 123.9 | 148.5 | 143.1 |
| March ... | 120.4 | 171.2 | 94.8 | 133.7 | 152.6 | 169.1 | 122.3 | 144.8 | 140.1 |
| April ... | 120.5 | 165.4 | 89.8 | 130.6 | 151.9 | 164.1 | 120.7 | 142.5 | 137.5 |
| May ... | 121.3 | 168.8 | 84.9 | 131.1 | 151.8 | 152.3 | 121.5 | 139.1 | 135.7 |
| June ... | 108.0 | 160.1 | 85.4 | 122.5 | 147.8 | 156.6 | 117.1 | 137.5 | 131.2 |
| July ... | 112.0 | 163.9 | 84.6 | 125.4 | 153.9 | 160.1 | 118.3 | 140.8 | 134.3 |
| Aug. ... | 116.5 | 164.4 | 85.0 | 127.5 | 152.9 | 159.0 | 116.2 | 139.3 | 134.3 |
| Sept. ... | 109.4 | 161.5 | 80.9 | 122.6 | 154.8 | 158.5 | 117.3 | 140.1 | 132.7 |
| Oct. ... | 105.4 | 158.3 | 81.2 | 119.8 | 155.5 | 156.1 | 113.3 | 137.8 | 130.2 |
| Nov. ... | 109.1 | 155.8 | 83.5 | 120.9 | 152.5 | 167.6 | 115.8 | 141.6 | 132.9 |
| Dec. ... | 112.2 | 151.3 | 83.2 | 120.5 | 153.2 | 155.8 | 114.5 | 137.6 | 130.4 |
| 1926. | | | | | | | | | |
| Jan. ... | 106.1 | 152.3 | 88.3 | 119.4 | 151.7 | 153.6 | 114.6 | 136.6 | 129.3 |
| Feb. ... | 103.6 | 154.6 | 87.0 | 118.8 | 151.5 | 146.0 | 115.3 | 134.5 | 127.9 |
| March ... | 102.0 | 150.3 | 85.1 | 116.2 | 147.6 | 146.8 | 114.3 | 133.3 | 126.1 |
| April ... | 104.3 | 155.1 | 86.3 | 119.2 | 145.1 | 139.9 | 113.6 | 130.2 | 125.5 |
| May ... | 104.3 | 154.5 | 89.3 | 119.5 | 147.1 | 138.0 | 113.8 | 130.2 | 125.7 |
| June ... | 103.7 | 155.4 | 89.5 | 119.7 | 151.9 | 129.3 | 113.6 | 128.7 | 124.9 |
| July ... | 106.9 | 155.0 | 87.4 | 120.5 | 159.1 | 127.8 | 113.2 | 130.0 | 126.0 |
| Aug. ... | 108.2 | 153.4 | 87.0 | 120.4 | 163.5 | 128.0 | 114.7 | 131.9 | 127.0 |
| Sept. ... | 105.4 | 154.2 | 90.2 | 120.1 | 175.7 | 123.4 | 114.4 | 133.7 | 128.0 |
| Oct. ... | 110.3 | 143.6 | 86.7 | 117.6 | 206.8 | 117.6 | 115.8 | 140.9 | 131.0 |
| Nov. ... | 110.1 | 141.7 | 89.9 | 117.5 | 207.4 | 114.9 | 116.5 | 140.5 | 130.8 |
| Dec. ... | 107.5 | 147.8 | 90.1 | 118.7 | 161.8 | 115.0 | 115.3 | 127.7 | 123.9 |
| 1927. | | | | | | | | | |
| Jan. ... | 108.3 | 143.4 | 87.2 | 116.7 | 156.1 | 118.3 | 116.6 | 127.7 | 123.1 |
| Feb. ... | 108.6 | 141.7 | 86.2 | 115.8 | 158.0 | 120.0 | 119.3 | 129.9 | 124.1 |
| March ... | 107.5 | 145.0 | 82.7 | 115.8 | 151.0 | 123.8 | 119.1 | 129.1 | 123.6 |
| April ... | 108.6 | 148.4 | 82.9 | 117.8 | 144.1 | 124.5 | 118.7 | 127.3 | 123.3 |
| May ... | 113.6 | 146.2 | 83.8 | 119.4 | 140.3 | 129.3 | 117.0 | 127.0 | 123.8 |
| June ... | 112.6 | 143.0 | 81.0 | 117.1 | 137.8 | 130.0 | 119.0 | 127.4 | 123.1 |
| July ... | 106.9 | 138.9 | 80.4 | 113.1 | 136.1 | 137.0 | 117.6 | 128.6 | 122.0 |
| Aug. ... | 109.4 | 137.7 | 80.8 | 113.8 | 132.7 | 141.4 | 118.4 | 129.3 | 122.8 |
| Sept. ... | 104.4 | 137.7 | 81.1 | 111.7 | 131.0 | 140.9 | 118.2 | 128.6 | 121.5 |
| Oct. ... | 105.4 | 125.3 | 81.4 | 107.8 | 132.7 | 140.4 | 120.9 | 130.1 | 120.6 |
| Nov. ... | 103.6 | 134.4 | 81.4 | 110.3 | 133.5 | 139.9 | 119.8 | 129.8 | 121.5 |
| Dec. ... | 104.5 | 136.6 | 83.1 | 111.8 | 132.1 | 135.4 | 121.1 | 128.5 | 121.4 |
| 1928. | | | | | | | | | |
| Jan. ... | 105.6 | 136.9 | 80.1 | 111.8 | 126.1 | 135.7 | 122.8 | 127.6 | 120.9 |
| Feb. ... | 107.3 | 144.2 | 79.4 | 115.0 | 121.3 | 137.7 | 119.3 | 125.5 | 121.1 |
| March ... | 113.8 | 150.2 | 81.4 | 120.4 | 123.4 | 136.7 | 119.7 | 125.9 | 123.6 |
| April ... | 118.5 | 151.2 | 80.7 | 122.6 | 124.5 | 139.6 | 121.2 | 127.8 | 125.6 |
| May ... | 120.9 | 157.5 | 82.4 | 126.3 | 124.6 | 139.6 | 117.2 | 126.1 | 126.2 |

The Minerals section was conspicuously weak. The quotation for Scotch pig iron fell over 1927 from 92s. 6d. to 70s. per ton, and that for Cleveland pig iron from 87s. 6d. to 65s. per ton. There were

also substantial reductions in the prices of iron bars, tin, lead and coal. The Textile group, on the contrary, made a conspicuous recovery over the year. The quotation for middling American cotton advanced from 6·89*d.* to 11·06*d.* per lb. Livonian flax advanced from £57 to £94 per ton. Wool also showed a net rise over the year, but hemp and silk were slightly lower.

The Sundries group provided further substantial changes in prices. The quotation for hides (River Plate, dry) rose over the year 1927 from 10½*d.* to 17*d.* per lb., and the average import price of hides from 8·8*d.* to 11·28*d.* per lb. Linseed oil fell from £31¼ to £27¾ per ton, and nitrate from 13½*s.* to 11½*s.* per cwt. The average import price of sawn timber for December 1927 was 117·55*s.* per load as against 107·31*s.*, the corresponding figure for December, 1926.

The following figures show in each case the average index-number of all the forty-five commodities for ten years (see the dotted line in the diagram of the *Journal*, 1886, and also the *Journal*, 1893, p. 220). These give the best picture of the gradual movement of the average prices of whole periods, as the ordinary fluctuations are still further obliterated.

| | | |
|-----------------|----------------|----------------|
| 1818-1827 = 111 | 1895-1904 = 67 | 1907-1916 = 88 |
| '28-'37 = 93 | '96-'05 = 68 | '08-'17 = 98 |
| '38-'47 = 93 | '97-'06 = 70 | '09-'18 = 110 |
| '48-'57 = 89 | '98-'07 = 71 | '10-'19 = 123 |
| '58-'67 = 99 | '99-'08 = 72 | '11-'20 = 146 |
| '68-'77 = 100 | 1900-'09 = 73 | '12-'21 = 148 |
| '78-'87 = 79 | '01-'10 = 73 | '13-'22 = 153 |
| '88-'97 = 67 | '02-'11 = 74 | '14-'23 = 157 |
| '90-'99 = 66 | '03-'12 = 76 | '15-'24 = 162 |
| '91-1900 = 66 | '04-'13 = 77 | '16-'25 = 165 |
| '92-'01 = 66 | '05-'14 = 79 | '17-'26 = 164 |
| '93-'02 = 66 | '06-'15 = 82 | '18-'27 = 159 |
| '94-'03 = 66 | | |

Closer calculation reveals the decade 1890-99 to have been the lowest on record. Since then the average has advanced from 66 to 159, or by 140·9 per cent. The decade 1916-25 is the highest on record.

No study of the trend of sterling prices over 1927 can afford to leave out of account the monetary and credit policies that were pursued in this country during the period in question. Throughout 1927, money rates in London were kept at a level consistently higher than that which obtained in the other principal gold countries. At the beginning of the year, the Bank rate was 5 per cent., a figure at which it had stood since December, 1925. The rate was reduced to 4½ per cent. on April 21 and remained at that level throughout the remainder of the year. The average for the year was 4·65 per cent. In New York the Federal Reserve Bank's rediscount rate was 4 per

cent. at the beginning of the year, was reduced to $3\frac{1}{2}$ per cent. in August, and remained at that level until May of this year. The official discount rate at Amsterdam stood at $3\frac{1}{2}$ per cent. throughout the greater part of the year, and in Berne it remained unchanged at $3\frac{1}{2}$ per cent. during the whole of 1927. The effect of the comparatively high level of the Bank of England rate on the course of sterling prices was further accentuated by the strict control which our central institution maintained over open-market discount rates. During the months of the $4\frac{1}{2}$ per cent. Bank rate, the open-market discount rate was consistently pegged at $4\frac{5}{16}$ per cent., and in order to keep this rate effective the Bank of England did not hesitate to have recourse to open-market operations on an extensive scale. The principal reason that prompted our authorities to maintain this firm control over London money rates was the defence of sterling exchange, firstly against the effect of the coal strike on our international balance of payments, secondly against the threat implied in the accumulation of substantial foreign balances in London. The power of the latter was illustrated in May, when the Bank of France saw fit to convert a small part of its sterling balances into gold and to withdraw it from the Bank of England. The amount involved was only £3,000,000, but it was sufficient to reveal the dependence of the London money market on the balances maintained here by foreign interests. The incident emphasized the need for keeping London money rates comparatively high. The fruits of this policy were evidenced by the surprising strength of sterling exchange over a year that must have witnessed some of the unfavourable effects of the industrial strife on our international balance of payments. The customary autumn pressure on sterling exchange was postponed and its incidence more evenly spread because the lower level of money rates obtaining in New York caused the bulk of our seasonal imports from the United States and Canada to be financed in New York and not, as is usually the case, in London.

The inevitable effect of the credit policy outlined above was that the trend of sterling prices did not conform to the general trend of gold prices throughout the world. While sterling prices fell over 1927 by 2.0 per cent., wholesale prices in the United States, measured by Bradstreet's index-number, rose by 5.9 per cent., those in Canada, measured by the index-number of the Bureau of Statistics, rose by 0.9 per cent.; those in Holland, measured by the index-number of the Bureau of Statistics, rose by 2.7 per cent.; those in Switzerland, measured by Dr. Lorenz's index-number, rose by 2.0 per cent.; those in Germany, measured by the *Frankfurter Zeitung's* index-number, rose by 1.1 per cent., and those in Sweden, measured by the *Svensk Finanstidnings* index-number, rose by 0.7 per cent. The strength

of sterling exchange over the past year may thus be regarded as reflecting an appreciation of its purchasing power parity *vis-à-vis* other gold currencies.

Silver.—The silver market, after the substantial fall in prices experienced in 1926, remained comparatively uneventful throughout 1927. The range in the quotations for cash delivery was only $3\frac{1}{4}d.$ per ounce. The widest fluctuations were recorded in the first month of the year, when the market was recovering from the shock caused by the Report of the Commission on Indian Currency and Finance, which foreshadowed sales of surplus silver. The highest cash quotation, $28d.$, was recorded in February, and the lowest, $24\frac{3}{4}d.$, in January. Comparative statistics of the world's production are appended:—

World's Production of Silver (in millions of ounces).

| | United States. | Mexico. | Canada. | Australia. | Other Countries. | Total. |
|------------|----------------|---------|---------|------------|------------------|--------|
| 1901... .. | 55.2 | 57.6 | 5.2 | 10.2 | 44.8 | 173.0 |
| '02... .. | 55.5 | 60.2 | 4.3 | 8.0 | 34.8 | 162.8 |
| '03... .. | 54.3 | 70.5 | 3.1 | 9.7 | 30.1 | 167.7 |
| '04... .. | 57.7 | 60.8 | 3.7 | 14.5 | 27.5 | 164.2 |
| '05... .. | 56.1 | 65.0 | 5.9 | 15.0 | 30.3 | 172.3 |
| '06... .. | 56.5 | 55.2 | 8.5 | 14.2 | 30.6 | 165.0 |
| '07... .. | 56.5 | 61.0 | 12.8 | 19.0 | 34.8 | 184.2 |
| '08... .. | 52.4 | 73.6 | 22.1 | 17.2 | 37.8 | 203.1 |
| '09... .. | 54.7 | 73.9 | 27.5 | 16.3 | 39.7 | 212.1 |
| '10... .. | 57.1 | 71.4 | 32.9 | 21.5 | 38.8 | 221.7 |
| '11... .. | 60.4 | 79.0 | 32.7 | 16.6 | 37.5 | 226.2 |
| '12... .. | 63.8 | 74.6 | 31.6 | 18.1 | 36.2 | 224.3 |
| '13... .. | 66.8 | 70.7 | 31.5 | 3.5 | 51.4 | 223.9 |
| '14... .. | 72.4 | 27.5 | 28.4 | 3.6 | 36.5 | 168.4 |
| '15... .. | 74.9 | 39.5 | 28.4 | 4.1 | 37.3 | 184.2 |
| '16... .. | 74.4 | 38.2 | 25.4 | 4.2 | 26.6 | 168.8 |
| '17... .. | 71.7 | 35.0 | 22.2 | 10.0 | 35.3 | 174.2 |
| '18... .. | 67.8 | 62.5 | 21.2 | 10.0 | 35.9 | 197.4 |
| '19... .. | 56.7 | 62.7 | 15.7 | 7.4 | 32.0 | 174.5 |
| '20... .. | 55.5 | 66.8 | 12.6 | 7.5 | 33.0 | 175.4 |
| '21... .. | 53.1 | 64.5 | 13.1 | 4.9 | 35.7 | 171.3 |
| '22... .. | 56.2 | 81.1 | 18.6 | 11.3 | 46.3 | 213.5 |
| '23... .. | 73.3 | 90.9 | 17.8 | 10.3 | 50.2 | 242.5 |
| '24... .. | 65.3 | 91.5 | 19.7 | 10.8 | 52.2 | 239.5 |
| '25... .. | 66.1 | 92.9 | 20.2 | 11.1 | 54.8 | 245.1 |
| '26... .. | 62.7 | 98.3 | 22.4 | 11.2 | 59.0 | 253.6 |
| '27* .. | 59.0 | 102.0 | 22.0 | 11.0 | 60.0 | 254.0 |

* Provisional.

The prices and index-numbers are as follows (60·84*d.** per standard oz., being parity of 1 gold to 15½ silver = 100) :—

| | Price per oz. standard. | Index- number. | | Price per oz. standard. | Index- number. |
|------------------|-------------------------------|-------------------|--------------------------|-------------------------------|-------------------|
| | <i>d.</i> | | | <i>d.</i> | |
| Average 1873 ... | 59½ | =97·4 | <i>Lowest</i> Nov., 1902 | 21½ | =35·6 |
| '90-99... | 3½ | =55·8 | End Dec., 1906 ... | 32½ | =53·1 |
| " 1917-26... | 40½ | =66·6 | " Dec., '08 ... | 23½ | =38·1 |
| " 1893 ... | 35½ | =58·6 | " Dec., '11 ... | 25½ | =41·2 |
| " '96 ... | 30½ | =50·5 | " Dec., '12 ... | 29 | =47·7 |
| " 1909 ... | 23½ | =38·9 | " Dec., '13 ... | 26½ | =43·7 |
| " '13 ... | 27½ | =45·3 | " June, '14 ... | 26 | =42·7 |
| " '14 ... | 25½ | =41·6 | " Dec., '14 ... | 22½ | =37·3 |
| " '15 ... | 23½ | =38·9 | " Dec., '15 ... | 26½ | =43·1 |
| " '16 ... | 31½ | =50·4 | " Dec., '16 ... | 36½ | =58·7 |
| " '17 ... | 40½ | =65·8 | " Dec., '17 ... | 43½ | =70·0 |
| " '18 ... | 47½ | =76·4 | " Dec., '18 ... | 48½ | =77·9 |
| " '19 ... | 57 | =85·3 | " Dec., '19 ... | 77½ | =98·3 |
| " '20 ... | 61½ | =76·1 | " Dec., '20 ... | 40½ | =49·2 |
| " '21 ... | 36½ | =48·1 | " Dec., '21 ... | 34½ | =49·3 |
| " '22 ... | 34½ | =51·6 | " Dec., '22 ... | 31½ | =49·6 |
| " '23 ... | 31½ | =49·4 | " Dec., '23 ... | 33½ | =49·0 |
| " '24 ... | 34 | =50·7 | " Dec., '24 ... | 31½ | =50·4 |
| " '25 ... | 32½ | =52·5 | " Dec., '25 ... | 31½ | =52·1 |
| " '26 ... | 28½ | =47·1 | " Dec., '26 ... | 25 | =41·1 |
| " '27 ... | 26½ | =42·8 | " Dec., '27 ... | 20½ | =43·6 |

* All the index-numbers in the table from 1916 to 1925 inclusive are calculated on the basis of the gold prices of silver instead of the sterling prices, though the latter are, of course, the actual price quotations given in the table. In arriving at the index-numbers the price of gold during 1916, 1917, and 1918 is taken as 86s. 9½*d.* per fine oz., derived from the "pegged" New York rate of \$4·76½ to the £. For 1919 the average price of gold is taken as 93s. 4½*d.*, this being the parity price with the U.S. dollar, the average New York exchange in that year being \$4·429. The index-numbers for other dates are based on the quotations in the London market for exportable gold. The average price in 1920 was 112s. 11½*d.* per fine oz., in 1921 107s. 0½*d.*, in 1922 93s. 4*d.*, in 1923 90s. 3*d.*, in 1924 93s. 8½*d.*, and in 1925 85s. 5½*d.* At the end of 1919 the quotation was 109s. 8½*d.*, at the end of 1920 116s. 1*d.*, at the end of 1921 98s. 0*d.*, at the end of 1922 88s. 11*d.*, at the end of 1923 95s. 4*d.*, and at the end of 1924 88s. 2*d.*

Gold.—The following table shows the world's annual gold production since 1850. Prior to 1911 the estimates are those of the Bureau of the U.S. Mint and other authorities. For years after 1911 the *Statist's* estimates are given. The value is taken throughout at about £4.25 per fine oz. The estimate for 1927 is subject to revision.

(000's omitted.)

| Year. | Value of output £ | Year. | Value of output. £ |
|-------------|-------------------------|-------------|--------------------------|
| 1850 | 11,600 | 1889 | 25,375 |
| '51 | 17,200 | '90 | 24,421 |
| '52 | 26,550 | '91 | 26,846 |
| '53 | 31,090 | '92 | 30,134 |
| '54 | 25,490 | '93 | 32,363 |
| '55 | 27,015 | '94 | 37,229 |
| '56 | 29,520 | '95 | 40,843 |
| '57 | 26,655 | '96 | 41,559 |
| '58 | 24,930 | '97 | 48,509 |
| '59 | 24,970 | '98 | 53,949 |
| '60 | 23,850 | '99 | 63,027 |
| '61 | 22,760 | 1900 | 52,312 |
| '62 | 21,550 | '01 | 53,630 |
| '63 | 21,390 | '02 | 60,975 |
| '64 | 22,600 | '03 | 67,337 |
| '65 | 24,040 | '04 | 71,380 |
| '66 | 24,220 | '05 | 78,143 |
| '67 | 22,805 | '06 | 82,707 |
| '68 | 21,945 | '07 | 84,857 |
| '69 | 21,245 | '08 | 90,995 |
| '70 | 21,370 | '09 | 93,302 |
| '71 | 25,400 | '10 | 93,544 |
| '72 | 24,200 | '11 | 94,930 |
| '73 | 23,600 | '12 | 95,783 |
| '74 | 22,950 | '13 | 97,481 |
| '75 | 22,700 | '14 | 92,709 |
| '76 | 22,540 | '15 | 97,114 |
| '77 | 23,830 | '16 | 92,597 |
| '78 | 22,020 | '17 | 57,236 |
| '79 | 21,400 | '18 | 78,605 |
| '80 | 22,130 | '19 | 73,978 |
| '81 | 21,150 | '20 | 68,522 |
| '82 | 20,500 | '21 | 67,848 |
| '83 | 20,640 | '22 | 66,723 |
| '84 | 20,830 | '23 | 77,888 |
| '85 | 21,250 | '24 | 81,807 |
| '86 | 21,430 | '25 | 82,267 |
| '87 | 21,735 | '26 | 82,211 |
| '88 | 22,644 | '27 | 84,201 |

The monthly (end of month) all-commodities index-numbers since 1885, together with quarterly averages for the group and final index-numbers since 1915 inclusive, are shown in the following pages.

Monthly Fluctuations of the Index-Numbers* of 45 Commodities, 1867-77 = 100.

| | Jan. | Feb. | March | April. | May | June. | July. | Aug. | Sept. | Oct. | Nov. | Dec. | Year. |
|------|-------|-------|-------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1885 | 72.3 | 72.6 | 72.5 | 72.5 | 73.3 | 72.7 | 72.2 | 72.2 | 71.1 | 70.4 | 71.1 | 70.8 | 72 |
| '86 | 70.0 | 70.5 | 70.1 | 69.2 | 69.1 | 68.7 | 68.8 | 69.1 | 68.9 | 68.8 | 69.8 | 69.5 | 69 |
| '87 | 69.5 | 68.5 | 68.3 | 68.4 | 68.2 | 67.9 | 68.1 | 68.3 | 68.2 | 67.7 | 69.1 | 72.4 | 68 |
| '88 | 70.9 | 70.6 | 69.9 | 69.8 | 68.1 | 67.4 | 69.0 | 70.1 | 71.9 | 72.4 | 72.7 | 73.2 | 70 |
| 1889 | 72.6 | 73.5 | 72.1 | 72.0 | 71.4 | 71.6 | 72.6 | 71.4 | 72.1 | 72.1 | 73.7 | 73.7 | 72 |
| '90 | 73.2 | 72.7 | 71.5 | 71.2 | 70.8 | 70.5 | 71.2 | 72.8 | 72.2 | 72.9 | 71.2 | 71.1 | 72 |
| '91 | 71.1 | 71.5 | 71.7 | 72.4 | 72.8 | 71.8 | 71.6 | 71.9 | 71.7 | 70.7 | 71.4 | 71.4 | 72 |
| '92 | 70.0 | 70.0 | 69.1 | 68.9 | 68.8 | 67.7 | 67.8 | 67.4 | 66.8 | 67.4 | 68.2 | 67.7 | 68 |
| '93 | 68.4 | 69.0 | 68.1 | 67.4 | 67.4 | 67.4 | 67.7 | 67.1 | 68.2 | 68.6 | 67.8 | 67.0 | 68 |
| 1894 | 65.8 | 65.0 | 64.3 | 63.8 | 63.1 | 63.1 | 62.6 | 63.0 | 62.7 | 61.7 | 60.8 | 60.1 | 63 |
| '95 | 60.0 | 60.0 | 60.8 | 61.7 | 62.5 | 62.4 | 62.8 | 63.3 | 63.5 | 63.3 | 62.3 | 61.2 | 62 |
| '96 | 61.4 | 61.4 | 60.7 | 60.3 | 60.1 | 59.3 | 59.2 | 59.7 | 61.2 | 62.6 | 62.6 | 62.0 | 61 |
| '97 | 62.0 | 61.9 | 61.9 | 61.5 | 61.2 | 61.3 | 61.7 | 63.2 | 63.4 | 62.7 | 62.4 | 62.4 | 62 |
| '98 | 62.8 | 63.4 | 63.0 | 65.5 | 66.4 | 64.7 | 64.3 | 64.0 | 63.9 | 63.6 | 63.9 | 63.8 | 64 |
| 1899 | 65.4 | 65.8 | 65.6 | 66.1 | 66.6 | 66.9 | 67.9 | 68.3 | 70.0 | 71.5 | 71.6 | 72.3 | 68 |
| 1900 | 74.0 | 75.1 | 75.7 | 75.6 | 75.5 | 75.7 | 76.2 | 76.0 | 75.5 | 74.7 | 73.9 | 73.4 | 75 |
| '01 | 72.2 | 71.7 | 71.0 | 70.6 | 70.5 | 69.8 | 69.5 | 69.8 | 69.6 | 69.6 | 69.0 | 68.4 | 70 |
| '02 | 68.8 | 68.9 | 69.2 | 69.7 | 70.9 | 70.4 | 70.0 | 69.5 | 69.3 | 68.8 | 68.6 | 69.1 | 69 |
| '03 | 69.5 | 70.2 | 70.4 | 69.4 | 69.6 | 69.5 | 69.5 | 70.0 | 69.1 | 69.0 | 69.0 | 70.0 | 69 |
| 1904 | 70.4 | 70.8 | 70.8 | 70.5 | 69.9 | 69.4 | 69.9 | 70.4 | 70.7 | 71.0 | 71.2 | 70.9 | 70 |
| '05 | 71.2 | 71.4 | 71.8 | 72.0 | 71.7 | 72.0 | 72.5 | 72.3 | 72.4 | 73.2 | 74.2 | 74.9 | 72 |
| '06 | 75.2 | 75.0 | 75.7 | 76.5 | 77.0 | 76.9 | 76.4 | 76.7 | 77.5 | 78.5 | 78.6 | 79.7 | 72 |
| '07 | 80.0 | 80.7 | 80.0 | 80.7 | 82.4 | 82.0 | 81.1 | 79.4 | 79.1 | 78.8 | 76.7 | 76.2 | 80 |
| '08 | 76.0 | 74.5 | 74.1 | 73.8 | 73.6 | 72.9 | 73.1 | 72.2 | 72.5 | 72.2 | 72.2 | 72.3 | 73 |
| 1909 | 72.0 | 71.9 | 72.4 | 74.3 | 75.4 | 75.1 | 75.2 | 74.9 | 74.7 | 75.2 | 75.5 | 76.3 | 74 |
| '10 | 77.1 | 78.1 | 79.1 | 78.5 | 78.2 | 76.9 | 78.1 | 78.2 | 77.6 | 77.2 | 77.8 | 77.9 | 78 |
| '11 | 78.5 | 78.6 | 78.9 | 80.0 | 80.3 | 80.0 | 78.9 | 79.5 | 80.3 | 80.7 | 80.6 | 80.9 | 80 |
| '12 | 81.8 | 82.9 | 84.4 | 85.0 | 85.3 | 85.5 | 86.5 | 85.9 | 86.7 | 85.8 | 85.3 | 86.4 | 85 |
| '13 | 86.4 | 86.4 | 86.7 | 86.2 | 85.7 | 84.1 | 84.2 | 85.0 | 85.7 | 84.5 | 83.3 | 83.8 | 85 |
| 1914 | 83.5 | 83.8 | 82.8 | 82.3 | 82.3 | 81.2 | 82.4 | 87.9 | 89.3 | 89.8 | 88.8 | 91.6 | 85 |
| '15 | 96.4 | 100.9 | 103.7 | 105.9 | 107.2 | 106.4 | 106.4 | 107.0 | 107.8 | 110.0 | 113.1 | 118.4 | 108 |
| '16 | 123.6 | 127.0 | 130.4 | 134.2 | 135.4 | 131.0 | 130.5 | 134.5 | 134.4 | 141.5 | 150.8 | 154.3 | 136 |
| '17 | 159.3 | 164.0 | 169.0 | 173.0 | 175.0 | 180.4 | 176.9 | 175.7 | 176.4 | 180.6 | 182.9 | 185.1 | 175 |
| '18 | 186.2 | 187.3 | 188.0 | 189.8 | 191.1 | 192.3 | 192.9 | 195.9 | 197.1 | 197.8 | 195.3 | 196.0 | 192 |
| 1919 | 190.1 | 187.7 | 184.7 | 184.6 | 194.6 | 199.4 | 206.4 | 212.7 | 214.8 | 224.3 | 231.0 | 235.2 | 206 |
| '20 | 245.3 | 260.4 | 261.8 | 266.1 | 260.0 | 255.7 | 254.6 | 253.5 | 248.7 | 239.9 | 223.8 | 207.2 | 251 |
| '21 | 197.2 | 163.0 | 177.2 | 169.8 | 162.2 | 155.8 | 158.2 | 154.3 | 149.4 | 138.4 | 136.7 | 133.6 | 155 |
| '22 | 132.5 | 132.2 | 133.3 | 134.8 | 135.5 | 135.6 | 134.0 | 129.6 | 127.9 | 130.1 | 130.6 | 129.1 | 131 |
| '23 | 130.2 | 131.9 | 132.7 | 134.0 | 132.2 | 127.9 | 124.8 | 125.0 | 127.8 | 127.7 | 132.4 | 133.2 | 129 |
| 1924 | 137.2 | 138.8 | 137.0 | 136.8 | 136.4 | 136.3 | 138.4 | 138.0 | 141.6 | 146.1 | 145.5 | 147.7 | 139 |
| '25 | 144.8 | 143.1 | 140.1 | 137.5 | 135.7 | 131.2 | 134.3 | 134.3 | 132.7 | 130.2 | 132.9 | 130.4 | 136 |
| '26 | 129.3 | 127.9 | 126.1 | 125.5 | 125.7 | 124.9 | 126.0 | 127.0 | 128.0 | 131.0 | 130.8 | 123.9 | 126 |
| '27 | 123.1 | 124.1 | 123.6 | 123.3 | 123.8 | 123.1 | 122.0 | 122.8 | 121.5 | 120.6 | 121.5 | 121.4 | 122 |
| '28 | 120.9 | 121.1 | 123.6 | 125.6 | 126.2 | | | | | | | | |

* The average of the twelve monthly figures of each year does not necessarily coincide with the annual figures, as the latter are calculated mostly from the average of 52 weekly quotations, while the former are based on end-of-the-month prices.

Quarterly Movements of Prices.*

Summary of Index-Numbers, 1867-77 = 100.

| Years. | Quar- ter. | Vege- table Food (corn, etc.). | Animal Food (meat, etc.). | Sugar, Coffee, and Tea. | Total Food | Mine- rals. | Tex- tiles. | Sundry Mate- rials. | Total Mate- rials. | Grand Total. | Sil- ver.† |
|--------|---------------|--|------------------------------------|----------------------------------|---------------|----------------|----------------|---------------------------|--------------------------|-----------------|---------------|
| 1916 | I | 125.1 | 137.5 | 78.9 | 119.9 | 150.0 | 118.1 | 131.1 | 132.2 | 127.0 | 43.7 |
| | II | 127.2 | 157.0 | 88.2 | 130.0 | 156.2 | 120.4 | 135.0 | 136.2 | 133.3 | 52.1 |
| | III | 127.9 | 150.4 | 85.9 | 127.4 | 154.1 | 127.8 | 133.5 | 137.3 | 133.1 | 50.4 |
| | IV | 163.1 | 159.8 | 92.2 | 147.0 | 160.1 | 146.2 | 147.0 | 150.3 | 148.8 | 55.2 |
| '17 | I | 181.2 | 182.5 | 100.6 | 164.7 | 163.3 | 166.6 | 161.5 | 163.6 | 164.1 | 59.5 |
| | II | 188.8 | 197.8 | 107.0 | 174.9 | 169.0 | 184.4 | 176.8 | 177.1 | 177.3 | 61.1 |
| | III | 168.2 | 194.3 | 114.9 | 166.6 | 168.6 | 201.3 | 179.9 | 183.4 | 176.3 | 72.1 |
| | IV | 161.7 | 192.6 | 133.1 | 167.1 | 172.6 | 215.6 | 192.8 | 194.3 | 182.8 | 70.3 |
| '18 | I | 168.2 | 199.6 | 136.2 | 173.0 | 177.9 | 223.2 | 191.3 | 197.5 | 187.1 | 70.2 |
| | II | 167.6 | 201.9 | 123.7 | 171.0 | 182.4 | 223.1 | 207.9 | 205.7 | 191.0 | 77.8 |
| | III | 174.9 | 206.6 | 123.9 | 175.8 | 191.8 | 228.2 | 207.3 | 209.5 | 195.3 | 79.1 |
| | IV | 177.6 | 229.6 | 126.1 | 185.8 | 184.2 | 218.5 | 205.8 | 204.0 | 196.3 | 78.8 |
| '19 | I | 171.2 | 216.6 | 121.6 | 177.4 | 173.1 | 202.5 | 201.2 | 194.0 | 188.1 | 77.3 |
| | II | 169.9 | 206.4 | 126.5 | 175.3 | 189.0 | 210.5 | 214.1 | 206.5 | 192.8 | 81.1 |
| | III | 178.0 | 207.1 | 165.5 | 183.7 | 226.1 | 228.9 | 234.9 | 230.7 | 211.3 | 84.2 |
| | IV | 184.3 | 226.6 | 177.6 | 198.2 | 251.5 | 270.1 | 242.6 | 253.4 | 230.1 | 95.7 |
| '20 | I | 211.4 | 234.0 | 207.9 | 219.0 | 289.8 | 298.2 | 267.0 | 282.7 | 255.7 | 96.7 |
| | II | 244.5 | 250.1 | 243.0 | 246.3 | 296.3 | 271.8 | 254.5 | 271.1 | 260.6 | 79.2 |
| | III | 226.7 | 287.2 | 207.6 | 245.0 | 309.4 | 247.3 | 232.2 | 257.7 | 252.3 | 71.5 |
| | IV | 208.2 | 280.4 | 126.4 | 217.7 | 293.0 | 190.0 | 214.2 | 227.7 | 223.6 | 57.6 |
| '21 | I | 151.4 | 270.6 | 100.1 | 184.5 | 222.6 | 153.5 | 187.9 | 186.7 | 185.8 | 46.8 |
| | II | 150.3 | 225.2 | 89.2 | 164.8 | 187.9 | 140.1 | 159.0 | 160.9 | 162.6 | 45.5 |
| | III | 149.8 | 202.5 | 81.4 | 155.3 | 174.3 | 142.7 | 147.6 | 153.4 | 154.0 | 48.0 |
| | IV | 118.3 | 166.9 | 78.3 | 127.8 | 149.6 | 150.0 | 132.3 | 142.4 | 136.2 | 52.4 |
| '22 | I | 114.0 | 177.0 | 75.9 | 129.2 | 132.2 | 142.4 | 131.8 | 135.2 | 132.7 | 49.7 |
| | II | 116.0 | 199.5 | 80.3 | 139.2 | 134.7 | 136.0 | 128.3 | 132.4 | 135.3 | 52.9 |
| | III | 102.4 | 152.8 | 82.8 | 127.9 | 138.3 | 139.7 | 123.3 | 132.2 | 130.5 | 53.2 |
| | IV | 98.7 | 176.0 | 87.6 | 124.9 | 141.1 | 145.1 | 120.7 | 133.7 | 129.9 | 50.3 |
| '23 | I | 94.0 | 175.3 | 100.6 | 125.3 | 154.4 | 139.4 | 122.2 | 136.2 | 131.6 | 50.1 |
| | II | 96.1 | 164.0 | 110.2 | 124.0 | 156.6 | 141.9 | 120.3 | 136.6 | 131.4 | 50.5 |
| | III | 100.3 | 157.7 | 96.2 | 120.6 | 149.0 | 134.8 | 113.9 | 129.7 | 125.9 | 48.2 |
| | IV | 101.1 | 152.0 | 105.1 | 120.7 | 158.9 | 153.5 | 115.0 | 138.7 | 131.1 | 48.8 |
| '24 | I | 115.1 | 146.2 | 111.5 | 126.6 | 169.0 | 159.6 | 121.0 | 145.9 | 137.7 | 48.8 |
| | II | 118.3 | 153.3 | 97.2 | 127.5 | 156.7 | 165.2 | 118.4 | 143.1 | 136.5 | 49.9 |
| | III | 121.8 | 159.7 | 99.7 | 131.1 | 157.1 | 173.1 | 117.3 | 145.2 | 139.2 | 51.6 |
| | IV | 134.5 | 160.0 | 108.3 | 138.4 | 163.9 | 182.7 | 122.5 | 152.2 | 146.4 | 52.4 |
| '25 | I | 129.0 | 165.6 | 98.8 | 136.1 | 157.0 | 171.6 | 123.9 | 147.5 | 142.7 | 51.6 |
| | II | 116.6 | 164.8 | 86.7 | 128.1 | 150.5 | 157.8 | 119.8 | 139.7 | 134.8 | 51.5 |
| | III | 112.6 | 163.3 | 83.5 | 125.2 | 153.9 | 159.2 | 117.3 | 140.1 | 133.8 | 53.3 |
| | IV | 108.9 | 155.1 | 82.6 | 120.4 | 153.7 | 159.8 | 114.5 | 139.0 | 131.2 | 53.1 |
| '26 | I | 103.9 | 152.4 | 86.8 | 118.1 | 150.3 | 148.8 | 147.7 | 134.8 | 127.8 | 50.6 |
| | II | 104.1 | 155.0 | 88.4 | 119.5 | 148.0 | 135.7 | 113.7 | 129.7 | 125.4 | 49.3 |
| | III | 106.8 | 154.2 | 88.2 | 120.3 | 166.1 | 126.4 | 114.1 | 131.9 | 127.0 | 47.4 |
| | IV | 109.3 | 144.4 | 88.9 | 117.9 | 192.0 | 115.8 | 115.9 | 136.4 | 128.6 | 41.2 |
| '27 | I | 108.1 | 143.4 | 85.4 | 116.1 | 155.0 | 120.7 | 118.3 | 128.9 | 123.6 | 43.0 |
| | II | 111.6 | 145.9 | 82.6 | 118.1 | 140.7 | 127.9 | 118.2 | 127.2 | 123.4 | 43.0 |
| | III | 106.9 | 138.1 | 80.8 | 112.9 | 133.3 | 139.8 | 118.1 | 128.8 | 122.1 | 42.1 |
| | IV | 104.5 | 132.1 | 82.0 | 110.0 | 132.8 | 138.6 | 120.6 | 129.5 | 121.2 | 43.3 |

* The averages of the four quarterly figures of each year do not necessarily coincide with the annual averages, as the latter are based as far as possible on average weekly prices. See also the *Journal*, 1893, p. 221; 1895, p. 144; 1901, p. 90; and 1909, p. 70.

† Silver 60.84¢ per oz., being the parity of 1 gold to 15½ silver, = 100 (see note on p. 401).

Construction of the Tabular Statements.

The index-numbers here given are based on the average prices for the eleven years 1867-77. Take, for instance, the *Gazette* price of English wheat :—

| | s. | d. | |
|---------------------|----|----|---|
| Average, 1867-77... | 54 | 6 | = 100, average point. |
| „ 1914 ... | 35 | 0 | = 64, or 36 per cent. <i>below</i> the average point. |
| „ 1920 ... | 80 | 7 | = 148, „, 48 „, <i>above</i> „ „ |
| „ 1926 ... | 53 | 3 | = 98, „, 2 „, <i>below</i> „ „ |

The individual index-numbers, therefore, represent simple percentages of the average point.

The articles are grouped in six categories :—

| | | 1867-77. Total Numbers. | Example for 1927. | |
|---|-------------|-------------------------------|-------------------|----------|
| | | | Total Numbers. | Average. |
| 1. Vegetable food, corn, etc. (wheat flour, barley, oats, maize, potatoes, and rice) ... | 8 Index-nos | 800 | 867 | 108 |
| 2. Animal food (beef, mutton, pork, bacon, and butter) ... | 7 „ | 700 | 967 | 138 |
| 3 Sugar, coffee, and tea ... | 4 „ | 400 | 332 | 83 |
| 1—3. <i>Food</i> ... | 19 „ | 1,900 | 2,166 | 114 |
| 4. Minerals (iron, copper, tin, lead, and coal) ... | 7 „ | 700 | 990 | 141 |
| 5. Textiles (cotton, flax, hemp jute, wool, and silk) ... | 8 „ | 800 | 1,045 | 131 |
| 6. Sundry materials (hides, leather, tallow, oils, soda, nitrate, in- digo, and timber) ... | 11 „ | 1,100 | 1,302 | 118 |
| 4—6. <i>Materials</i> ... | 26 „ | 2,600 | 3,337 | 129 |
| <i>General average</i> ... | 45 „ | 4,500 | 5,503 | 122 |

The general average is drawn from all forty-five descriptions, which are treated as of equal value, and is the simple arithmetical mean as shown above.

Average Prices of Commodities.*

| No. of Article } | 0 | 1 2 | | 3 | 4 | 5 | 6 | 7 | 8 | 1-5 | 9 10 | |
|---|---------------------------------|---------------------|----------------------|---|----------------------|----------------------|---------------------------------|-----------------|-------------------------------|------------------------|-----------------|-----------------|
| | | Wheat. | | 1 our | Barley | Oats. | Mixed | Potatoes | Rice. | Year- table Food | Beef † | |
| | | English Gazette. | Ameri- can. | Town Made white (now "G.R.") (250 lbs.) | English Gazette | English Gazette | Ameri- can Mixed | Good English | Rangoon Cargo to Arrive | | Prime | Mul- dhar. |
| Year. | Silver. d per oz | s. and d. per qr | s. and d. per qr. | s. and d. per qr. | s. and d. per qr. | s. and d. per qr. | s. per qr | s. per ton. | s. and d per cwt | Total | d per 5 lbs. | d per 5 lbs. |
| 1873 ... | 59½ | 58.8 | 63 | 51 | 40.5 | 25.5 | 30 | 160 | 9.6 | — | 65 | 56 |
| '96 ... | 30½ | 26.2 | 29 | 25 | 22.11 | 14.9 | 15 | 55 | 6.2 | — | 45 | 34 |
| 1911 ... | 24 ⁹ / ₁₆ | 31.8 | 35 | 29 | 27.3 | 18.10 | 25½ | 87 | 8.2 | — | 51 | 45 |
| '12 ... | 28½ | 34.9 | 38 | 32 | 30.8 | 21.6 | 27½ | 86 | 10.1 | — | 56 | 49 |
| '13 ... | 27 ⁹ / ₁₆ | 31.9 | 36.5 | 30½ | 27.3 | 19.1 | 23½ | 78 | 8.2 | — | 54 | 49 |
| '14 ... | 25 ⁶ / ₁₆ | 35.0 | 40.1 | 33½ | 27.2 | 21.0 | 29½ | 71½ | 9.1 | — | 56½ | 52½ |
| '15 ... | 23½ | 53.11 | 59.10 | 49 | 37.4 | 30.9 | 41½ | 93½ | 13.3 | — | 72½ | 67½ |
| '16 ... | 31 ¹ / ₁₆ | 58.5 | 67.7 | 52½ | 51.7 | 33.5 | 52½ | 153½ | 16.10 | — | 81½ | 76½ |
| '17 ... | 40½ | 75.9 | 83.3 | 58½ | 64.10 | 51.7 | 71½ | 186½ | 25.3 | — | 104½ | 101 |
| '18 ... | 47½ | 72.9 | 78.7 | 46½ | 59.0 | 49.3 | 78½ | 142½ | 26.2 | — | 103 | 103 |
| '19 ... | 57 | 72.10 | 74.10 | 46½ | 75.8 | 52.3 | 78½ | 198½ | 25.10 | — | 108 | 108 |
| '20 ... | 61 ¹ / ₁₆ | 80.7 | 92.4 | 66 | 90 | 57.4 | 90½ | 242½ | 41.10 | — | 125 | 125 |
| '21 ... | 36½ | 72.9 | 73.9 | 64½ | 54.4 | 34.3 | 38½ | 198 | 18.5 | — | 115 | 109½ |
| '22 ... | 34 ¹ / ₁₆ | 47.10 | 52.11 | 45½ | 40.1 | 29.1 | 31½ | 130 | 14.10 | — | 88½ | 82 |
| '23 ... | 31½ | 42.2 | 47.3 | 39½ | 33.8 | 26.8 | 36 | 101 | 14.10 | — | 79½ | 74½ |
| '24 ... | 34 | 49.3 | 53.9 | 43½ | 46.9 | 27.2 | 39½ | 186 | 16.9 | — | 82½ | 76½ |
| '25 ... | 32½ | 52.2 | 62.4 | 50½ | 42.0 | 27.2 | 38 ¹ / ₁₆ | 154 | 16.0 | — | 80 | 73½ |
| '26 ... | 28½ | 53.3 | 58.9 | 49½ | 36.11 | 25.1 | 29½ | 127 | 16.3 | — | 74 | 67 |
| '27 ... | 26½ | 49.3 | 58.3 | 44 ¹ / ₁₆ | 42.0 | 25.4 | 30 ¹ / ₁₆ | 136 | 15.11 | — | 70 | 62 |
| Average | 26½ | 31½ | 36 | 30 | 25½ | 18½ | 24½ | 78 | 7½ | — | 51 | 44½ |
| 1904-13 | 34 | 28½ | 31½ | 27½ | 25½ | 17½ | 19½ | 72 | 6½ | — | 47 | 37½ |
| 1890-99 | 50 | 40 | 43½ | 34½ | 31½ | 21 | 25 | 102 | 8 | — | 55½ | 46 |
| '78-87 | 54 | 40 | 43½ | 34½ | 31½ | 21 | 25 | 102 | 8 | — | 55½ | 46 |
| '67-77 | 58½ | 54½ | 56 | 46 | 39 | 26 | 32½ | 117 | 10 | — | 59 | 50 |
| Index-Numbers (or Percentages) of Prices, the Average of 1867-77 being 100. | | | | | | | | | | | | |
| 1873 ... | 97.4 | 108 | 113 | 104 | 104 | 98 | 92 | 137 | 95 | 851 | 110 | 112 |
| '96 ... | 50.4 | 48 | 52 | 54 | 59 | 57 | 46 | 47 | 62 | 425 | 76 | 68 |
| 1911 ... | 40.4 | 58 | 63 | 63 | 70 | 72 | 78 | 74 | 82 | 560 | 87 | 90 |
| '12 ... | 46.1 | 64 | 68 | 70 | 79 | 83 | 85 | 74 | 101 | 624 | 93 | 98 |
| '13 ... | 45.3 | 58 | 65 | 66 | 70 | 73 | 73 | 67 | 82 | 554 | 92 | 98 |
| '14 ... | 41.6 | 64 | 72 | 73 | 70 | 81 | 90 | 61 | 91 | 602 | 96 | 105 |
| '15 ... | 38.9 | 99 | 107 | 106 | 96 | 118 | 128 | 80 | 132 | 866 | 122 | 136 |
| '16 ... | 50.4 | 107 | 121 | 114 | 132 | 128 | 163 | 131 | 168 | 1,064 | 138 | 154 |
| '17 ... | 65.8 | 139 | 149 | 127 | 166 | 199 | 221 | 160 | 252 | 1,413 | 177 | 202 |
| '18 ... | 76.4 | 134 | 140 | 102 | 151 | 190 | 241 | 122 | 262 | 1,342 | 174 | 207 |
| '19 ... | 83.3 | 134 | 134 | 102 | 194 | 201 | 242 | 170 | 258 | 1,435 | 183 | 216 |
| '20 ... | 76.1 | 148 | 165 | 143 | 231 | 221 | 279 | 207 | 418 | 1,812 | 212 | 250 |
| '21 ... | 48.1 | 133 | 132 | 140 | 139 | 132 | 118 | 169 | 184 | 1,147 | 195 | 220 |
| '22 ... | 51.6 | 88 | 95 | 100 | 103 | 112 | 96 | 111 | 148 | 853 | 150 | 164 |
| '23 ... | 49.4 | 77 | 84 | 86 | 86 | 103 | 111 | 86 | 148 | 781 | 134 | 149 |
| '24 ... | 50.7 | 90 | 96 | 95 | 120 | 105 | 122 | 159 | 167 | 954 | 139 | 152 |
| '25 ... | 52.5 | 96 | 111 | 109 | 108 | 105 | 119 | 132 | 160 | 940 | 136 | 147 |
| '26 ... | 47.1 | 98 | 105 | 107 | 95 | 96 | 92 | 109 | 163 | 865 | 125 | 134 |
| '27 ... | 44.5 | 90 | 104 | 98 | 108 | 97 | 95 | 116 | 159 | 867 | 119 | 124 |

* The annual prices are the average monthly or weekly quotations, except potatoes, which are the average weekly quotations during the eight months January to April and September to December.

† Not included in the general average.

‡ Meat (9-13), by the carcase, in the London Central Meat Market.

§ La Plata from 1924.

Average Prices of Commodities—Contd.

| No. of Article | 11 | | 12 | 13 | 14 | 15 | 9-15 | 16A | 16B | 17 | 18A | 18B | 18 |
|-------------------|------------------|------------------|----|-----------------------------------|-----------------|----------------------------------|-------------------------|---|---------------------------------------|------------------------------------|---|----------------|---------------------------|
| | Mutton. | | | Pork. | Bacon. | Butter. | | Sugar. | | | Coffee. | | |
| | Prime | Mul- dmg. | | Large and small, average | Water- fold. | Fine- lmd. Fine to Tine | | British West Indian Refining | Beet, German, ss p c, i o b. | Java, floating Cargoes \$ | Ceylon Planta- tion, Low Mul- dmg. † | Bio. Good. | Mean c 18A and 18B. |
| Year. | d. per 8 lbs. | d. per 8 lbs. | | d. per 8 lbs. | s. per cwt. | s. per cwt. | Animal Food Total | s. per cwt. | s. per cwt. | s. per cwt. | s. per cwt. | s. per cwt. | |
| 1873 ... | 71 | 63 | | 54 | 81 | 123 | — | 22½ | 25 | 28 | 100 | 86 | — |
| '96 ... | 53 | 39 | | 35 | 50 | 98 | — | 10½ | 10½ | 12½ | 95 | 58 | — |
| 1911 ... | 55 | 49 | | 46 | 56 | 121 | — | 11½ | 13 | 14 | 83 | 58 | — |
| '12 ... | 59 | 54 | | 50 | 69 | 123 | — | 11 | 12½ | 13½ | 87 | 66 | — |
| '13 ... | 62 | 56 | | 55 | 77 | 119 | — | 9½ | 9½ | 10½ | 81 | 53 | — |
| '14 ... | 64 | 57½ | | 49 | 75½ | 120 | — | 11½ | 12½ | 13½ | 79 | 45 | — |
| '15 ... | 75½ | 69½ | | 72 | 93½ | 141 | — | 14½ | 17½ | 18½ | 78½ | 43½ | — |
| '16 ... | 93½ | 86½ | | 87½ | 109½ | 191 | — | 24½ | 22½ | 26½ | 77½ | 50 | — |
| '17 ... | 114 | 109½ | | 110½ | 148 | 216 | — | 31½ | 25½ | 32½ | 94½ | 58 | — |
| '18 ... | 109 | 109 | | 128 | 183 | 247 | — | 33 | 26½ | 35½ | 128½ | 69 | — |
| '19 ... | 114 | 114 | | 128 | 190 | 252 | — | 38 | 34½ | 43½ | 145 | 114½ | — |
| '20 ... | 144½ | 144½ | | 168½ | 239½ | 301 | — | 58 | 65½ | 74½ | 148 | 111½ | — |
| '21 ... | 130½ | 125½ | | 121½ | 179 | 250 | — | 19½ | 18½ | 22 | 120½ | 63 | — |
| '22 ... | 125 | 121½ | | 101 | 145½ | 202½ | — | 15 | 14½ | 15½ | 120½ | 74½ | — |
| '23 ... | 114½ | 107½ | | 89 | 113½ | 186 | — | 25½ | 23½ | 24½ | 117½ | 55½ | — |
| '24 ... | 111½ | 103½ | | 70 | 106 | 211 | — | 23½ | 20½ | 21½ | 132½ | 85½ | — |
| '25 ... | 106½ | 98½ | | 84½ | 128½ | 206½ | — | 16½ | 11½ | 12½ | 153½ | 98½ | — |
| '26 ... | 89 | 80½ | | 98½ | 130 | 173 | — | 16½ | 11½ | 12½ | 154½ | 89½ | — |
| '27 ... | 86 | 79 | | 85 | 102½ | 178 | — | 16½ | 12½ | 13½ | 143½ | 71½ | — |
| Average | | | | | | | | | | | | | |
| 1904-13 | 58½ | 51½ | | 47½ | 67 | 113 | — | 10½ | 10½ | 12 | 75½ | 43½ | — |
| 1890-99 | 54½ | 41½ | | 42½ | 59 | 100 | — | 11½ | 11½ | 13½ | 98 | 62 | — |
| '78-87 | 64½ | 53 | | 49 | 71 | 116 | — | 17 | 18 | 21½ | 78 | 52 | — |
| '67-77 | 63 | 55 | | 52 | 74 | 125 | — | 23 | 24 | 28½ | 87 | 64 | — |

Index-Numbers (or Percentages) of Prices, the Average of 1867-77 being 100.

| 1873 ... | 113 | 114 | 104 | 109 | 98 | 760 | 101 | 98 | 115 | 134 | 125 | | |
|----------|-----|-----|-----|-----|-----|-------|-----|-----|-----|-----|-----|--|--|
| '96 ... | 84 | 71 | 67 | 68 | 78 | 512 | 46 | 44 | 109 | 91 | 100 | | |
| 1911 ... | 87 | 89 | 88 | 89 | 97 | 627 | 52 | 49 | 95 | 91 | 93 | | |
| '12 ... | 94 | 98 | 96 | 93 | 98 | 672 | 49 | 47 | 100 | 103 | 102 | | |
| '13 ... | 99 | 102 | 105 | 104 | 95 | 695 | 40 | 38 | 93 | 83 | 88 | | |
| '14 ... | 102 | 105 | 94 | 102 | 96 | 700 | 50 | 48 | 91 | 70 | 81 | | |
| '15 ... | 119 | 127 | 138 | 126 | 113 | 881 | 67 | 66 | 90 | 68 | 79 | | |
| '16 ... | 148 | 157 | 169 | 148 | 153 | 1,067 | 100 | 93 | 90 | 78 | 84 | | |
| '17 ... | 182 | 199 | 212 | 200 | 173 | 1,345 | 121 | 115 | 109 | 91 | 100 | | |
| '18 ... | 174 | 199 | 248 | 247 | 198 | 1,447 | 127 | 123 | 148 | 110 | 129 | | |
| '19 ... | 181 | 207 | 246 | 238 | 202 | 1,493 | 155 | 153 | 167 | 180 | 174 | | |
| '20 ... | 230 | 263 | 324 | 324 | 241 | 1,844 | 263 | 262 | 170 | 174 | 172 | | |
| '21 ... | 208 | 228 | 234 | 242 | 200 | 1,527 | 81 | 77 | 140 | 98 | 119 | | |
| '22 ... | 199 | 221 | 194 | 196 | 162 | 1,286 | 62 | 54 | 140 | 116 | 128 | | |
| '23 ... | 182 | 196 | 171 | 154 | 149 | 1,135 | 104 | 87 | 135 | 86 | 111 | | |
| '24 ... | 177 | 188 | 135 | 143 | 169 | 1,103 | 93 | 75 | 175 | 133 | 154 | | |
| '25 ... | 169 | 180 | 162 | 174 | 165 | 1,133 | 60 | 43 | 176 | 154 | 165 | | |
| '26 ... | 141 | 146 | 190 | 176 | 138 | 1,050 | 60 | 44 | 178 | 139 | 159 | | |
| '27 ... | 136 | 145 | 163 | 138 | 142 | 967 | 62 | 47 | 165 | 112 | 139 | | |

* Index-numbers not included in general average.

† East India good middling from 1908

§ Raw Centrifugals, 96 per cent. Pol., from 1924

|| Comparative values

|| White Javas, C.I.F., from 1924

Average Prices of Commodities—Contd.

| No. of Article. | 191 | 190 | 190 | 19 | 16 19 | 1-19 | 201 | 206 | 21 | 22 | — | 20 |
|---|-----------|-----------------------------|-----------------------------|---------------------------|---------------------------------------|-----------------|--|--------------------|--------------|------------------------------------|------|------|
| Year. | Tea. | | | | Sum, (offic. and Tea. Total. | Food. Total. | Iron | | Copper | | Tin. | |
| | (Common.) | Indian, (Good Medium) | Average Import Price. | Mean of 191 and 190 | | | (Leve- land (Mid- dle- brough) Piz. | Bars, (Common.) | Strain- d | English (like the struts. | | |
| | £ per lb. | £ per lb. | £ and d. per lb. | £ per ton | | | £ and d. per ton | £ per ton | £ per ton | £ per ton | | |
| 1873 ... | 12 | — | 16.67 | — | — | — | 117.3 | — | 12½ | 84 | 92 | 132 |
| '96 ... | 4 | 7½ | 9.55 | — | — | — | 46.10 | 38.2 | 5 | 47 | 50 | 60 |
| 1911 ... | 5½ | 8½ | 9.00 | — | — | — | 53.5 | 47.3 | 6½ | 56 | 60 | 191 |
| '12 ... | 5½ | 8½ | 8.78 | — | — | — | 64.2 | 58.2 | 7½ | 73 | 78 | 210 |
| '13 ... | 5 | 8½ | 9.06 | — | — | — | 65.6 | 58.3 | 7½ | 68 | 73½ | 201 |
| '14 ... | 6 | 8½ | 9.19 | — | — | — | 57.1 | 54.0 | 7 | 59½ | 64½ | 151 |
| '15 ... | 8½ | 10½ | 11.01 | — | — | — | 71.2 | 65.2 | 10½ | 72½ | 82½ | 164 |
| '16 ... | 8 | 10½ | 11.29 | — | — | — | 90.0 | 84.0 | 13½ | 115½ | 134 | 182 |
| '17 ... | 16½ | 15½ | 14.68† | — | — | — | 95.7 | 89.7 | 13½ | 124½ | 136½ | 238 |
| '18 ... | 20½ | 16 | 15.0 | — | — | — | 101.0 | 95.0 | 14 | 115½ | 126 | 331 |
| '19 ... | 13½ | 15 | 15.5 | — | — | — | 143.1 | 137.1 | 19½ | 92 | 99½ | 257 |
| '20 ... | 11½† | 9½ | 14.97 | — | — | — | 214.11 | 208.11 | 28½ | 97½ | 112½ | 302 |
| '21 ... | 4½ | 7 | 12.4 | — | — | — | 168.6 | 137.4 | 19½ | 69½ | 72 | 171 |
| '22 ... | 8½ | 13½ | 14.9 | — | — | — | 99.10 | 90.7 | 11½ | 63½ | 66½ | 162 |
| '23 ... | 11 | 17½ | 17.58 | — | — | — | 108.0 | 108.9 | 11½ | 65½ | 69½ | 206 |
| '24 ... | 9½ | 17½ | 18.0 | — | — | — | 96.8 | 88.2 | 12½ | 63½ | 67½ | 251 |
| '25 ... | 7½ | 14½ | 18.34 | — | — | — | 83.4 | 72.8 | 11½ | 61½ | 65½ | 267 |
| '26 ... | 7½ | 16½ | 18.82 | — | — | — | 87.2 | 87.6 | 11½ | 58½ | 63½ | 297½ |
| '27 ... | 6½ | 14½ | 18.58 | — | — | — | 80.5 | 73.0 | 11½ | 55½ | 60½ | 303½ |
| Average | 7½ | 7½ | 8½ | — | — | — | 57½ | 51½ | 6½ | 67½ | 72 | 164½ |
| 1904-13 | 4½ | 7½ | 9½ | — | — | — | 47 | 41½ | 5½ | 50 | 53 | 81 |
| 1890-99 | 6½ | — | 12½ | — | — | — | 46 | 38 | 5½ | 55 | 60 | 89 |
| '78-87 | 11½ | — | 17½ | — | — | — | 69 | 60 | 8½ | 75 | 81 | 105 |
| Index-Numbers (or Percentages) of Prices, the Average of 1867-77 being 100. | | | | | | | | | | | | |
| | * | * | * | * | * | * | * | * | * | * | * | * |
| 1873 ... | 107 | — | 97 | 102 | 426 | 2,037 | 170 | — | 152 | 112 | — | 126 |
| '96 ... | 36 | — | 56 | 46 | 236 | 1,173 | 68 | — | 61 | 63 | — | 57 |
| 1911 ... | 47 | — | 52 | 50 | 244 | 1,431 | 78 | — | 77 | 75 | — | 182 |
| '12 ... | 48 | — | 51 | 50 | 248 | 1,544 | 95 | — | 89 | 97 | — | 200 |
| '13 ... | 44 | — | 52 | 48 | 214 | 1,463 | 96 | — | 94 | 91 | — | 191 |
| '14 ... | 53 | — | 53 | 53 | 232 | 1,534 | 84 | — | 85 | 79 | — | 144 |
| '15 ... | 74 | — | 64 | 69 | 281 | 2,028 | 106 | — | 128 | 97 | — | 156 |
| '16 ... | 71 | — | 65 | 68 | 345 | 2,476 | 135 | — | 166 | 154 | — | 173 |
| '17 ... | 150 | — | 85 | 117 | 453 | 3,211 | 144 | — | 166 | 166 | — | 227 |
| '18 ... | 186 | — | 87 | 137 | 518 | 3,307 | 152 | — | 170 | 154 | — | 315 |
| '19 ... | 120 | — | 90 | 105 | 587 | 3,515 | 217 | — | 234 | 123 | — | 245 |
| '20 ... | 100 | — | 88 | 94 | 791 | 4,447 | 329 | — | 343 | 130 | — | 288 |
| '21 ... | 39 | — | 72 | 55 | 332 | 3,006 | 237 | — | 232 | 92 | — | 163 |
| '22 ... | 77 | — | 86 | 82 | 326 | 2,465 | 148 | — | 136 | 84 | — | 154 |
| '23 ... | 98 | — | 102 | 100 | 402 | 2,318 | 168 | — | 144 | 88 | — | 196 |
| '24 ... | 82 | — | 110 | 96 | 418 | 2,475 | 143 | — | 152 | 84 | — | 239 |
| '25 ... | 70 | — | 106 | 88 | 356 | 2,429 | 121 | — | 144 | 82 | — | 254 |
| '26 ... | 69 | — | 109 | 89 | 352 | 2,267 | 135 | — | 139 | 77 | — | 283 |
| '27 ... | 60 | — | 108 | 84 | 332 | 2,166 | 119 | — | 136 | 74 | — | 289 |

* Index-numbers not included in the general average.

† Approximate.

‡ Nominal.

Average Prices of Commodities—Contd.

| No. of Article } | 21 Lead. | 25A Wall-end Hotton in London. | 25B New- castle Steam. | 26 Average Export Price. | 20-26 Mine- rals. Total. | 27 Cotton. Mil- ding Ameri- can. | 28 Fair Hhol- lands. | 29A Petro- grad. | 29B Russian Average Import Price. | 30A Manila Fair Roping. | 30B Petro- grad Clean. | 31 Food Me- dium. |
|--------------------|------------------|--|---------------------------------|-----------------------------------|-----------------------------------|---|-------------------------------|------------------------|---|----------------------------------|---------------------------------|----------------------------|
| Year. | English Fig. | | | | | d. per lb. | d. per lb. | £ per ton. | £ per ton. | £ per ton. | £ per ton. | £ per ton. |
| 1873 ... | 23 $\frac{1}{2}$ | 32 | — | 20-90 | — | 9 | 6 $\frac{1}{2}$ | 47 $\frac{1}{2}$ | 44 | 43 | 36 | 18 |
| '96 ... | 11 $\frac{1}{2}$ | 15 $\frac{1}{2}$ | 8 | 8-85 | — | 4 | 3 $\frac{1}{2}$ | 26 | 27 | 17 $\frac{1}{2}$ | 25 | 12 $\frac{1}{2}$ |
| '11 ... | 14 $\frac{3}{4}$ | 17 $\frac{3}{4}$ | 10 $\frac{3}{4}$ | 11-43 | — | 7-04 | 6 | 37 | 43 $\frac{1}{2}$ | 20 | 33 | 20 $\frac{1}{4}$ |
| '12 ... | 18 $\frac{1}{2}$ | 21 $\frac{1}{2}$ | 14 $\frac{1}{2}$ | 12-70 | — | 6-45 | 5 $\frac{1}{2}$ | 36 $\frac{1}{2}$ | 40 $\frac{1}{2}$ | 26 | 37 | 21 |
| '13 ... | 19 $\frac{1}{4}$ | 21 $\frac{1}{2}$ | 15 $\frac{1}{2}$ | 13-94 | — | 7-01 | 5 $\frac{1}{2}$ | 34 | 41 $\frac{1}{2}$ | 31 $\frac{3}{4}$ | 38 | 26 $\frac{1}{2}$ |
| '14 ... | 19 $\frac{1}{4}$ | 21 $\frac{1}{2}$ | 14 $\frac{1}{2}$ | 13-65 | — | 6-41 | 4 $\frac{1}{2}$ | 33 | 38 | 26 $\frac{3}{4}$ | 43 | 27 $\frac{1}{4}$ |
| '15 ... | 24 | 30 $\frac{1}{2}$ * | 21 $\frac{1}{2}$ | 16-96 | — | 5-87 | 4 $\frac{1}{2}$ | 59 $\frac{1}{2}$ | 66 $\frac{3}{4}$ | 41 $\frac{1}{2}$ | 60 $\frac{1}{2}$ | 21 $\frac{1}{2}$ |
| '16 ... | 32 $\frac{1}{2}$ | 27 $\frac{1}{2}$ * | 41 $\frac{1}{2}$ | 24-64 | — | 9-00 | 7 | 76 $\frac{1}{2}$ | 85 $\frac{1}{2}$ | 54 $\frac{3}{4}$ | 71 | 31 |
| '17 ... | 32 $\frac{1}{2}$ | 27 $\frac{1}{2}$ * | 30 | 27-16 | — | 16-55 | 13 $\frac{1}{2}$ | 113 | 151 $\frac{1}{2}$ | 84 $\frac{1}{2}$ | 105 $\frac{1}{2}$ | 39 $\frac{3}{4}$ |
| '18 ... | 32 $\frac{1}{2}$ | 33 $\frac{1}{2}$ | 33 $\frac{1}{2}$ | 30-6 | — | 22-3 | 17 $\frac{1}{2}$ | 120 $\frac{1}{2}$ | 156 $\frac{1}{2}$ | 99 $\frac{1}{2}$ | 166 $\frac{1}{2}$ | 39 $\frac{1}{4}$ |
| '19 ... | 29 $\frac{1}{2}$ | 45 $\frac{1}{2}$ | 45 $\frac{1}{2}$ | 46-2 | — | 19-65 | 14 $\frac{1}{2}$ | 120 $\frac{1}{2}$ | 174 $\frac{1}{2}$ | 58 $\frac{1}{2}$ | 147 $\frac{1}{2}$ | 50 $\frac{1}{2}$ |
| '20 ... | 40 | 32 | 51 $\frac{1}{2}$ | 79-8 | — | 23-14 | 13 $\frac{1}{2}$ | 120 $\frac{1}{2}$ | 345 $\frac{1}{2}$ | 65 $\frac{1}{2}$ | 145 $\frac{1}{2}$ | 44 $\frac{1}{2}$ |
| '21 ... | 24 $\frac{1}{2}$ | 32 $\frac{1}{2}$ | 29 | 34-83 | — | 9-4 | 5 $\frac{1}{2}$ | 112 $\frac{1}{2}$ | 118 $\frac{1}{2}$ | 40 $\frac{1}{2}$ | 145 $\frac{1}{2}$ | 27 $\frac{1}{2}$ |
| '22 ... | 25 $\frac{1}{2}$ | 34 $\frac{1}{2}$ | 24 $\frac{1}{2}$ | 24-16 | — | 12-10 | 8 | 95 | 84 $\frac{1}{2}$ | 33 $\frac{1}{2}$ | 57 $\frac{1}{2}$ | 30 $\frac{1}{4}$ |
| '23 ... | 28 $\frac{1}{2}$ | 32 $\frac{1}{2}$ | 28 | 25-13 | — | 15-25 | 10 | 83 $\frac{1}{2}$ | 84 $\frac{1}{2}$ | 33 $\frac{1}{2}$ | 57 | 26 |
| '24 ... | 35 $\frac{1}{2}$ | 27 $\frac{1}{2}$ | 22 $\frac{1}{2}$ | 23-38 | — | 16-26 | 11-03 | 120 | 104 $\frac{1}{2}$ | 44 | 81 | 31 $\frac{1}{4}$ |
| '25 ... | 37 $\frac{1}{2}$ | 29 $\frac{1}{2}$ | 16 $\frac{1}{2}$ | 20-08 | — | 12-64 | 11-01 | 92 $\frac{1}{2}$ | 120 $\frac{1}{2}$ | 46 $\frac{1}{2}$ | 89 $\frac{1}{2}$ | 40 $\frac{1}{4}$ |
| '26 ... | 32 $\frac{1}{2}$ | **30 $\frac{1}{2}$ | **16 $\frac{1}{2}$ | 18-59 | — | 9-40 | 7-75 | 65 | 72 $\frac{1}{2}$ | 43 | 74 $\frac{1}{2}$ | 43 $\frac{1}{2}$ |
| '27 ... | 25 $\frac{1}{2}$ | 23 $\frac{1}{2}$ | 14 $\frac{1}{2}$ | 17-80 | — | 9-54 | 8-27 | 95 $\frac{1}{2}$ | 74 $\frac{1}{2}$ | 43 $\frac{1}{2}$ | 66 $\frac{1}{2}$ | 32 $\frac{1}{2}$ |
| Average 1904-13 | 15 $\frac{1}{2}$ | 18 $\frac{1}{2}$ | 117 $\frac{1}{2}$ | 117 $\frac{1}{2}$ | — | 6 $\frac{1}{2}$ | 5 | 32 $\frac{1}{2}$ | 367 $\frac{1}{2}$ | 303 $\frac{1}{2}$ | 313 $\frac{1}{2}$ | 187 $\frac{1}{2}$ |
| 1890-99 | 12 | 17 $\frac{1}{2}$ | 10 $\frac{1}{2}$ | 10 $\frac{1}{2}$ | — | 4 $\frac{1}{2}$ | 3 | 27 | 27 $\frac{1}{2}$ | 26 $\frac{1}{2}$ | 25 | 12 $\frac{1}{2}$ |
| '78-87 | 14 | 16 $\frac{1}{2}$ | 8 $\frac{1}{2}$ | 9 | — | 6 | 4 $\frac{1}{2}$ | 33 | 34 | 35 $\frac{1}{2}$ | 26 $\frac{1}{2}$ | 15 |
| '67-77 | 20 $\frac{1}{2}$ | 22 | 12 $\frac{1}{2}$ | 12 $\frac{1}{2}$ | — | 9 | 6 $\frac{1}{2}$ | 46 | 48 | 43 | 35 | 19 |

Index-Numbers (or Percentages) of Prices, the Average of 1867-77 being 100.

| | | | | | | | | | | |
|----------|-----|-----|---|-----|-------|-----|-----|-----|-----|-----|
| 1873 ... | 117 | 145 | — | 167 | 989 | 100 | 92 | 97 | 101 | 95 |
| '96 ... | 56 | 68 | — | 71 | 444 | 48 | 46 | 56 | 55 | 64 |
| '11 ... | 70 | 81 | — | 91 | 654 | 78 | 89 | 86 | 68 | 107 |
| '12 ... | 89 | 99 | — | 102 | 771 | 72 | 79 | 82 | 81 | 111 |
| '13 ... | 93 | 98 | — | 112 | 775 | 78 | 84 | 80 | 89 | 140 |
| '14 ... | 95 | 97 | — | 109 | 693 | 71 | 67 | 76 | 89 | 143 |
| '15 ... | 117 | 140 | — | 136 | 880 | 65 | 64 | 134 | 130 | 111 |
| '16 ... | 159 | 125 | — | 197 | 1,109 | 100 | 104 | 172 | 161 | 163 |
| '17 ... | 158 | 125 | — | 217 | 1,203 | 183 | 201 | 282 | 243 | 207 |
| '18 ... | 158 | 153 | — | 245 | 1,347 | 248 | 253 | 294 | 341 | 207 |
| '19 ... | 143 | 206 | — | 370 | 1,538 | 218 | 219 | 313 | 264 | 264 |
| '20 ... | 195 | 145 | — | 638 | 2,068 | 237 | 203 | 495 | 270 | 236 |
| '21 ... | 118 | 147 | — | 279 | 1,268 | 104 | 86 | 246 | 237 | 145 |
| '22 ... | 123 | 156 | — | 193 | 994 | 134 | 118 | 191 | 116 | 162 |
| '23 ... | 139 | 147 | — | 201 | 1,083 | 169 | 148 | 179 | 116 | 137 |
| '24 ... | 175 | 125 | — | 187 | 1,105 | 181 | 163 | 239 | 160 | 167 |
| '25 ... | 183 | 135 | — | 161 | 1,080 | 140 | 163 | 227 | 174 | 261 |
| '26 ... | 157 | 138 | — | 149 | 1,078 | 104 | 115 | 147 | 151 | 231 |
| '27 ... | 125 | 105 | — | 142 | 990 | 106 | 123 | 181 | 141 | 172 |

* Approximate prices.

† Approximate.

‡ Nominal

§ Best Yorkshire house after 1916.

|| Now No. 1 Omra, Fine.

¶ Livonian Z.K. from 1921.

** Average price January-April, 1926.

Average Prices of Commodities—Contd.

| No. of Article | 32A | 32B | 33 | 34 | 27-34 | 35A | 35B | 35C | 36A | 36B | 37 |
|-----------------|--------------------------------------|----------------------------------|----------------------------|------------------|------------------|-------------------|----------------------|-----------------------|------------------|-----------------------|------------------|
| | Wool. | | | Silk. | | Hides. | | | Leather. | | Tallow. |
| Year. | Merino, Port Phillip Average Fleece. | Merino, Adelaide Average Greasy. | English, Lincoln Half Hog. | Tsatiee. † | Textiles. Total. | River Plate, Dry. | River Plate, Salted. | Average Import Price. | Dressing Hides. | Average Import Price. | Town. |
| | d. per lb. | d. per lb. | d. per lb. | s. per lb. | | d. per lb. | d. per lb. | d. and dec. per lb. | d. per lb. | d. per lb. | s. per cwt. |
| 1873 ... | 25 | 11 $\frac{3}{4}$ | 24 $\frac{1}{2}$ | 21 $\frac{3}{4}$ | — | 11 | 8 $\frac{1}{2}$ | — | 18 $\frac{1}{2}$ | — | 44 |
| '96 ... | 13 | 6 $\frac{3}{4}$ | 11 $\frac{1}{2}$ | 10 $\frac{3}{4}$ | — | 6 $\frac{3}{4}$ | 5 $\frac{3}{4}$ | 4-89 | 13 $\frac{1}{2}$ | 13 $\frac{1}{2}$ | 21 |
| 1911 ... | 17 $\frac{1}{2}$ | 8 $\frac{1}{2}$ | 10 | 10 $\frac{3}{4}$ | — | 9 $\frac{3}{4}$ | 7 $\frac{1}{2}$ | 7-17 | 17 | 17 $\frac{1}{2}$ | 33 $\frac{1}{2}$ |
| '12 ... | 17 $\frac{3}{4}$ | 9 $\frac{1}{2}$ | 10 $\frac{1}{2}$ | 10 $\frac{3}{4}$ | — | 10 $\frac{3}{4}$ | 8 $\frac{3}{4}$ | 7-51 | 17 $\frac{1}{2}$ | 17 $\frac{1}{2}$ | 33 |
| '13 ... | 18 | 9 $\frac{1}{2}$ | 12 $\frac{1}{2}$ | 11 | — | 12 $\frac{3}{4}$ | 9 $\frac{1}{2}$ | 8-62 | 19 $\frac{1}{2}$ | 19 $\frac{1}{2}$ | 34 $\frac{1}{2}$ |
| '14 ... | 18 $\frac{1}{2}$ | 9 $\frac{1}{2}$ | 12 $\frac{1}{2}$ | 10 $\frac{3}{4}$ | — | 13 $\frac{3}{4}$ | 9 $\frac{1}{2}$ | 9-11 | 21 $\frac{1}{2}$ | 19 $\frac{1}{2}$ | 31 $\frac{1}{2}$ |
| '15 ... | 21 $\frac{3}{4}$ | 10 $\frac{3}{4}$ | 17 $\frac{1}{2}$ | 9 $\frac{1}{2}$ | — | 13 | 11 | 10-04 | 28 $\frac{3}{4}$ | 21 $\frac{1}{2}$ | 36 $\frac{3}{4}$ |
| '16 ... | 32 $\frac{3}{4}$ | 16 $\frac{1}{2}$ | 20 | 16 $\frac{1}{2}$ | — | 14 $\frac{3}{4}$ | 13 $\frac{1}{2}$ | 11-70 | 28 $\frac{1}{2}$ | 27 | 46 $\frac{1}{2}$ |
| '17 ... | 46 $\frac{1}{2}$ | 23 $\frac{1}{2}$ | 20 $\frac{3}{4}$ | 21 $\frac{1}{2}$ | — | 20 | 16 | 15-52 | 35 | 34 $\frac{1}{2}$ | 62 $\frac{1}{2}$ |
| '18 ... | 47 $\frac{1}{2}$ | 23 $\frac{1}{2}$ | 18 $\frac{3}{4}$ | 25 $\frac{1}{2}$ | — | 20 $\frac{1}{2}$ | 13 $\frac{3}{4}$ | 15-9 | 32 $\frac{1}{2}$ | 32 $\frac{1}{2}$ | 81 $\frac{1}{2}$ |
| '19 ... | 67 | 32 $\frac{3}{4}$ | 22 $\frac{3}{4}$ | 26 | — | 22 $\frac{1}{2}$ | 19 $\frac{3}{4}$ | 17-1 | 36 $\frac{1}{2}$ | 40 $\frac{1}{2}$ | 87 $\frac{1}{2}$ |
| '20 ... | 79 $\frac{3}{4}$ | 32 | 22 | 38 $\frac{3}{4}$ | — | 20 $\frac{1}{2}$ | 18 $\frac{1}{2}$ | 20-1 | 43 $\frac{1}{2}$ | 71 $\frac{1}{2}$ | 75 |
| '21 ... | 31 $\frac{3}{4}$ | 11 $\frac{5}{8}$ | 8 $\frac{3}{4}$ | 26 $\frac{1}{2}$ | — | 9 $\frac{1}{2}$ | 8 $\frac{3}{4}$ | 9-58 | 25 $\frac{1}{2}$ | 46 $\frac{1}{2}$ | 36 $\frac{1}{2}$ |
| '22 ... | 39 | 17 $\frac{1}{2}$ | 9 $\frac{1}{2}$ | 28 $\frac{1}{2}$ | — | 9 $\frac{1}{2}$ | 8 $\frac{3}{4}$ | 8-06 | 24 $\frac{1}{2}$ | 36 | 34 $\frac{1}{2}$ |
| '23 ... | 43 $\frac{1}{2}$ | 20 $\frac{1}{2}$ | 12 | 24 $\frac{1}{2}$ | — | 9 $\frac{1}{2}$ | 8 $\frac{1}{2}$ | 8-23 | 23 $\frac{1}{2}$ | 31 $\frac{1}{2}$ | 36 $\frac{1}{2}$ |
| '24 ... | 53 $\frac{1}{2}$ | 25 $\frac{1}{2}$ | 18 $\frac{3}{4}$ | 25 $\frac{1}{2}$ | — | 10 $\frac{3}{4}$ | 8 $\frac{3}{4}$ | 8-63 | 22 $\frac{1}{2}$ | 33 $\frac{1}{2}$ | 42 $\frac{1}{2}$ |
| '25 ... | 41 $\frac{1}{2}$ | 17 $\frac{3}{4}$ | 17 $\frac{1}{2}$ | 18 $\frac{1}{2}$ | — | 11 $\frac{1}{2}$ | 8 $\frac{1}{2}$ | 9-57 | 23 | 33 | 42 $\frac{1}{2}$ |
| '26 ... | 36 $\frac{1}{2}$ | 16 $\frac{1}{2}$ | 15 | 15 $\frac{1}{2}$ | — | 10 $\frac{1}{2}$ | 8 | 9-32 | 21 $\frac{1}{2}$ | 35 $\frac{1}{2}$ | 38 $\frac{1}{2}$ |
| '27 ... | 38 $\frac{1}{2}$ | 17 $\frac{1}{2}$ | 15 $\frac{1}{2}$ | 15 $\frac{1}{2}$ | — | 12 $\frac{1}{2}$ | 10 $\frac{1}{2}$ | 9-85 | 22 $\frac{1}{2}$ | 36 $\frac{1}{2}$ | 33 $\frac{1}{2}$ |
| Average 1904-13 | 17 $\frac{3}{4}$ | 9 | 10 $\frac{3}{4}$ | 11 $\frac{1}{2}$ | — | 9 $\frac{5}{8}$ | 7 $\frac{1}{2}$ | 6 $\frac{3}{8}$ | 16 | 17 | 31 $\frac{1}{2}$ |
| 1890-99 | 13 $\frac{3}{4}$ | 6 $\frac{3}{4}$ | 10 | 11 $\frac{1}{2}$ | — | 6 $\frac{1}{2}$ | 5 $\frac{1}{2}$ | 5 | 13 $\frac{1}{2}$ | 13 $\frac{3}{4}$ | 25 |
| '78-87 | 18 $\frac{1}{2}$ | 8 $\frac{3}{4}$ | 11 $\frac{1}{2}$ | 15 | — | 8 $\frac{3}{4}$ | 6 $\frac{3}{4}$ | 6 $\frac{1}{2}$ | 15 | 17 | 35 $\frac{1}{2}$ |
| '67-77 | 21 $\frac{1}{2}$ | 9 $\frac{3}{4}$ | 19 $\frac{1}{2}$ | 23 | — | 9 | 7 | 6 $\frac{3}{8}$ | 16 | 18 $\frac{1}{2}$ | 45 |

Index Numbers (or Percentages) of Prices, the Average of 1867-77 being 100

| | | | | | | | | | | | |
|---------|-----|---|-----|-----|-------|-----|---|---|-----|---|-----|
| 873 ... | 118 | — | 124 | 95 | 822 | 120 | — | — | 114 | — | 97 |
| '96 ... | 62 | — | 58 | 46 | 435 | 77 | — | — | 84 | — | 77 |
| 911 ... | 83 | — | 51 | 47 | 609 | 106 | — | — | 99 | — | 74 |
| '12 ... | 86 | — | 53 | 46 | 610 | 114 | — | — | 101 | — | 73 |
| '13 ... | 88 | — | 63 | 48 | 670 | 133 | — | — | 112 | — | 76 |
| '14 ... | 90 | — | 64 | 47 | 647 | 139 | — | — | 118 | — | 70 |
| '15 ... | 104 | — | 88 | 43 | 739 | 149 | — | — | 145 | — | 81 |
| '16 ... | 159 | — | 101 | 71 | 1,031 | 174 | — | — | 160 | — | 104 |
| '17 ... | 219 | — | 106 | 94 | 1,535 | 225 | — | — | 200 | — | 139 |
| '18 ... | 222 | — | 95 | 112 | 1,772 | 218 | — | — | 188 | — | 182 |
| '19 ... | 315 | — | 114 | 113 | 1,820 | 258 | — | — | 222 | — | 195 |
| '20 ... | 359 | — | 111 | 168 | 2,099 | 257 | — | — | 330 | — | 167 |
| '21 ... | 140 | — | 44 | 115 | 1,117 | 123 | — | — | 205 | — | 81 |
| '22 ... | 180 | — | 49 | 125 | 1,075 | 114 | — | — | 174 | — | 77 |
| '23 ... | 206 | — | 61 | 105 | 1,121 | 113 | — | — | 158 | — | 81 |
| '24 ... | 254 | — | 96 | 102 | 1,362 | 119 | — | — | 163 | — | 94 |
| '25 ... | 188 | — | 87 | 79 | 1,319 | 132 | — | — | 161 | — | 94 |
| '26 ... | 170 | — | 76 | 69 | 1,063 | 121 | — | — | 164 | — | 85 |
| '27 ... | 177 | — | 78 | 67 | 1,045 | 142 | — | — | 172 | — | 75 |

* Port Phillip fleece washed nominal since 1895, exactly in proportion with the value of clean wool

† Common New Style from 1921.

Average Prices of Commodities—Contd.

| No. of Article | Oil. | | | 40B | 41 | 42 | 43 | 44 | 45A | 45B | 35-45 | 20-15 | 1-15 |
|----------------|------------|------------|------------|------------|--------------|-------------|------------------|------------|--------------------------|-----------------------------|--------------------------------------|------------|--------------|
| | Palm. | Olive. | Lin-seed. | Seeds. | Petro-leum. | Soda. | Nitrate of Soda. | Indigo. | Timber. | | Sundry Materials. | Materials. | Grand Total. |
| Year. | £ per ton. | £ per ton. | £ per ton. | s. per qr. | d. per gall. | s. per ton. | s. per cwt. | s. per lb. | Bengal, Gool. Consuming. | Hewn, Average Import Price. | Sawn or Split, Average Import Price. | Total. | Total. |
| '73 ... | 38 | 43 | 32 | 62 | 15½ | 100 | 15½ | 6½ | 65 | 62 | — | — | — |
| '96 ... | 22 | 30 | 17½ | 33 | 5½ | 42 | 8 | 4½ | 40 | 44 | — | — | — |
| '11 ... | 34½ | 50 | 42½ | 70 | 5½ | 57 | 10 | 3 | 38 | 57 | — | — | — |
| '12 ... | 33 | 48 | 35½ | 60 | 8½ | 53 | 11½ | 2½ | 41 | 60 | — | — | — |
| '13 ... | 35½ | 40½ | 24½ | 45½ | 8½ | 47½ | 11½ | 2½ | 40 | 63 | — | — | — |
| '14 ... | 37½ | 50½ | 24½ | 48½ | 7½ | 47½ | 10½ | 5½ | 41½ | 64½ | — | — | — |
| '15 ... | 34½ | 51½ | 30½ | 57½ | 8½ | 48½ | 12½ | 13½ | 58½ | 94½ | — | — | — |
| '16 ... | 44½ | 59½ | 41½ | 80½ | 12 | 78½ | 17½ | 13½ | 82½ | 148½ | — | — | — |
| '17 ... | 46 | 115½ | 56½ | 112½ | 16½ | 89½ | 25 | 10½ | 97½ | 210 | — | — | — |
| '18 ... | 44½ | 198½ | 63½ | 131½ | 21½ | 82½ | 27½ | 9 | 107½ | 271 | — | — | — |
| '19 ... | 69 | 200½ | 92½ | 139½ | 17½ | 118½ | 24½ | 0½ | 137½ | 232½ | — | — | — |
| '20 ... | 69½ | 200½ | 88½ | 157 | 25½ | 150½ | 24½ | 14½ | 119½ | 261½ | — | — | — |
| '21 ... | 36½ | 80½ | 31½ | 72½ | 22½ | 140 | 18½ | 11½ | 68½ | 156½ | — | — | — |
| '22 ... | 34½ | 75½ | 30½ | 75½ | 15½ | 123 | 14½ | 9½ | 46½ | 117½ | — | — | — |
| '23 ... | 36½ | 66½ | 42½ | 77½ | 13 | 103 | 13½ | 7½ | 48 | 131½ | — | — | — |
| '24 ... | 40½ | 79½ | 42½ | 81½ | 13½ | 101½ | 13½ | 6½ | 49½ | 122 | — | — | — |
| '25 ... | 40½ | 73½ | 43½ | 80½ | 13½ | 100 | 13½ | 5½ | 47½ | 122½ | — | — | — |
| '26 ... | 37½ | 79½ | 32½ | 63½ | 13 | 100 | 13½ | 5½ | 48½ | 107 | — | — | — |
| '27 ... | 34½ | 102½ | 31½ | 64½ | 13 | 100 | 12½ | 5½ | 45½ | 107½ | — | — | — |
| average | | | | | | | | | | | | | |
| 104-13 | 31½ | 43½ | 26½ | 49½ | 6½ | 60 | 10½ | 3 | 38 | 56 | — | — | — |
| 190-99 | 24½ | 35 | 19½ | 38 | 5½ | 53 | 8½ | 4½ | 40 | 45 | — | — | — |
| '78-87 | 32½ | 40 | 23 | 46 | 6½ | 62 | 12½ | 6 | 47 | 47 | — | — | — |
| '67-77 | 39 | 50 | 30 | 60 | 12½* | 92 | 14 | 7½ | 60 | 54 | — | — | — |

Index-Numbers (or Percentages) of Prices, the Average of 1867-77 being 100.

| | 97 | 86 | 105 | 122 | 109 | 110 | 92 | 111 | 1,163 | 2,074 | 5,011 |
|---------|-----|-----|-----|-----|-----|-----|-----|-----|-------|-------|--------|
| '73 ... | 97 | 86 | 105 | 122 | 109 | 110 | 92 | 111 | 1,163 | 2,074 | 5,011 |
| '96 ... | 56 | 60 | 56 | 44 | 46 | 57 | 59 | 74 | 690 | 1,569 | 2,742 |
| '11 ... | 88 | 100 | 125 | 43 | 62 | 71 | 41 | 83 | 892 | 2,155 | 3,586 |
| '12 ... | 85 | 96 | 106 | 66 | 58 | 80 | 38 | 89 | 906 | 2,287 | 3,831 |
| '13 ... | 90 | 99 | 78 | 68 | 52 | 82 | 38 | 90 | 918 | 2,363 | 3,826 |
| '14 ... | 84 | 101 | 82 | 61 | 52 | 78 | 80 | 93 | 958 | 2,298 | 3,832 |
| '15 ... | 89 | 104 | 97 | 71 | 53 | 90 | 184 | 134 | 1,197 | 2,816 | 4,844 |
| '16 ... | 114 | 119 | 135 | 96 | 86 | 128 | 183 | 202 | 1,501 | 3,641 | 6,117 |
| '17 ... | 118 | 231 | 187 | 129 | 98 | 178 | 142 | 270 | 1,917 | 4,655 | 7,866 |
| '18 ... | 115 | 396 | 216 | 170 | 90 | 194 | 124 | 332 | 2,225 | 5,344 | 8,651 |
| '19 ... | 178 | 400 | 258 | 138 | 128 | 177 | 126 | 325 | 2,405 | 5,763 | 9,278 |
| '20 ... | 179 | 400 | 272 | 203 | 164 | 177 | 200 | 335 | 2,684 | 6,851 | 11,298 |
| '21 ... | 95 | 160 | 116 | 177 | 152 | 135 | 158 | 198 | 1,600 | 3,985 | 6,991 |
| '22 ... | 89 | 151 | 127 | 122 | 134 | 102 | 128 | 143 | 1,361 | 3,430 | 5,895 |
| '23 ... | 93 | 133 | 134 | 104 | 112 | 96 | 103 | 157 | 1,284 | 3,488 | 5,806 |
| '24 ... | 103 | 160 | 138 | 105 | 111 | 97 | 84 | 151 | 1,325 | 3,792 | 6,267 |
| '25 ... | 104 | 147 | 137 | 105 | 109 | 96 | 79 | 150 | 1,314 | 3,713 | 6,142 |
| '26 ... | 96 | 159 | 106 | 104 | 109 | 95 | 78 | 137 | 1,254 | 3,395 | 5,662 |
| '27 ... | 88 | 205 | 107 | 104 | 109 | 90 | 76 | 134 | 1,302 | 3,337 | 5,503 |

* Petroleum average, 1873-77.

† Nominal.

REVIEWS OF STATISTICAL AND ECONOMIC BOOKS.

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1.—*A Study in Public Finance*. By A. C. Pigou, M.A., Professor of Political Economy in the University of Cambridge. xvii + 323 pp. Macmillan. London: 1928. Price 16s. net.

This volume forms the most impressive contribution of British thought towards the theory of Public Finance that has appeared for the best part of a generation. Subtle in conception, dispassionate in treatment, and trenchant in analysis, it is an achievement worthy of its distinguished author's reputation, and is destined at some future period, when its teachings have been thoroughly diffused, to exercise a profound influence in this field of investigation.

Whilst lacking to some extent in those attributes of organic unity and massive solidity that have characterized its predecessors, *The Economics of Welfare and Industrial Fluctuations*, it still presents, within the relatively narrow limits planned out, a coherent and impressive body of doctrine. Much that has hitherto passed for important in works on Public Finance is ignored with advantage, and the space set free has been devoted to that overhaul of old notions and development of new ones which the recent increase in the scale of public expenditure has made imperative. Nevertheless, it does not strike one that Professor Pigou has reached the end of his investigations. There is too much balancing of argument and qualification of judgment to suggest that the subject is closed as far as he is concerned, and indeed the cautious development of his elaborate trains of reasoning, with exhaustive qualifications and

reservations, indicates a mind critical of its own judgments and anxious to canvass the view points of others.

In accordance with the traditions of the Cambridge school, reliance is placed almost exclusively upon analytical and deductive methods. There is no historical background, details of fiscal technique are suppressed as far as possible, and little is attempted by way of statistical verification. This lack of concreteness makes for heavy reading and gives an impression of unreality and aloofness from actual affairs which is perhaps at variance with the author's true intentions.

In Part I (General Relations) the distinction, already familiar to statisticians, between *real* or *exhaustive* expenditure and *transfer* expenditure is elaborated, and attention drawn to some fallacies that result from failure to keep this distinction clear. It is emphasized that the amount of those kinds of Government expenditure which are optional, in the sense that they are not fixed by past contracts, should be determined with some reference to the burden involved in raising the money to finance them, and that the conception of a balance between marginal cost and marginal returns can be made to throw some light on the matter. Marginal analysis, in fact, supplies the keynote of the work. Taking local rates into consideration, exhaustive expenditure has risen from some 9½ per cent. to some 12½ per cent. of taxable income, and transfer expenditure from some 1½ per cent. to some 7½ per cent. A doctrine of *optimum* Government expenditure is developed in an interesting section, too long to quote and too complicated to summarize.

In Part II (Tax Revenue) Professor Pigou comes to grips with his subject, and here he has managed to rescue some of the more significant of the late Professor Edgeworth's contributions towards the pure theory of taxation from undeserved oblivion. The rival claims of *least aggregate sacrifice* and *equal sacrifice* to serve as ultimate principles of taxation are subjected to searching analysis, and it is concluded that for practical purposes the former may be regarded as the one ultimate principle. Without dissenting from this conclusion, one feels that justice has not been done to the claims of *equi-proportional sacrifice* as a principle of taxation.

The practical limitations of tax formulæ are well exhibited and, in respect of the income tax, at least, are shown to lend themselves to neat mathematical expression.

There are two factors, Professor Pigou says, upon which, when the amount of revenue to be raised is settled, the aggregate sacrifice involved in raising it depends, viz. the way in which the several parts of the total money impost are *distributed* among taxpayers and the scheme of formulæ in which their own particular liability is *announced*. If all the sacrifice involved in taxation were direct immediate sacrifice, the principle of least sacrifice would be satisfied—apart from announcement effects—by a system imposing equal marginal sacrifices upon all taxpayers. In view, however, of the effects upon capital accumulation of heavy taxes upon the rich and of heavy

taxes upon the poor, this arrangement would not in fact promote least sacrifice and an arrangement less severe both to the very rich and to the very poor is required.

Passing to the *announcement* aspect, it is pointed out that within equal income groups regressive formulæ are superior to proportionate, and proportionate to progressive formulæ, but that in view of the fact that most people's supply of work is fairly inelastic, the difference is not likely to be large. In an actual community consisting of persons of varying wealth, the above propositions are not necessarily valid, and there is an indication, which does not, however, amount to proof, that progressive taxes may be superior to regressive taxes even on the announcement side.

Professor Pigou's conclusion is that we must be content to seek the formula which, when viewed in connection with the whole tax system, is best from a distributional point of view, and leave it at that.

A chapter on the structure of an equal sacrifice income tax contains some old matter in a new setting. There is a neat demonstration that the tax formula which would constitute an equal sacrifice income tax, provided that the amount of work people do is not modified by the announcement effects of taxation, also insures that the amount of work they do shall, in fact, not be modified.

Some attention is given to Bernoulli's hypothesis, which Professor Pigou pronounces not unpalatable—much more palatable than Cramer's hypothesis. The plausibility is due, Professor Pigou thinks, to the fact that we have left out one important consideration, viz. that the satisfaction a man derives from the possession of a given income depends to some extent on the relation subsisting between it and the incomes of other people. An equal sacrifice income tax would *not* be provided by a system of tax-rates progressive only at low income levels and thereafter becoming approximately proportionate. Large incomes would need to be taxed at much higher rates than moderate incomes. This section would have borne further elaboration, for there are alternative formulæ affording a plausible connection between satisfaction and money income, and some discussion of their merits together with their implications by way of tax graduation would have been helpful.

A chapter on Taxes on Foreign Trade contains some interesting mathematical theorems. Assuming for the sake of simplicity that this country's foreign trade transactions can be expressed in terms of two commodities, Professor Pigou evolves some neat expressions connecting elasticities of demand and supply. Assuming further that this country transacts one-seventh of the world's total foreign trade, it is shown that in the absence of special circumstances the contribution to our revenue which we could reckon to obtain from the foreigner is one-eighth of our total receipts from general import and export duties. It appears that no single country acting alone is likely to be able to throw any large part of the burden of general import or export taxes upon foreigners, and that Great Britain in present conditions is very weak in this respect.

In Part III (Finance by Borrowing) considerable use has been made of material taken from the *Political Economy of War*. The doctrines propounded are already familiar to Professor Pigou's readers and it is unnecessary to summarize them.

L. R. C.

2.—*International Trade*. By Prof. F. W. Taussig. xxi + 425 pp. New York: Macmillan. 1927. Price 15s.

This book might serve as a model of economic method. The first part builds up the theory of international trade by synthesis. It starts with the simplest cases, and gradually introduces the requisite complications and qualifications till all the essential factors have been allowed for. The treatment is primarily intended, no doubt, for students, but it has the deeper merit of a real logical basis.

The synthesis once completed, there follows the second part, problems of verification. Some striking statistics of relative costs, relative wages and relative productivity in different countries (particularly the United States and European countries) are followed by two chapters on monetary theory. Then come studies in the foreign trade of Canada, Great Britain, and the United States, with special reference to such topics as the export and import of capital, the balance of payments, the terms of trade and price movements.

A third part, comprising five chapters on International Trade under Inconvertible Paper, concludes the book.

The theory of International Trade so treated cannot fail to be intimately related to monetary theory, and as Professor Taussig's investigation proceeds, monetary theory plays a more and more prominent part in it. He takes as the fundamental case an international gold standard, the first tentative assumption being that "an inflow of gold from one country to another causes prices to fall in the first, to rise in the second" (p. 12). When he comes to the stage of verification, he elaborates this simple principle; "it is the inflow or outflow of specie which primarily affects the discount policy of the banks" and so "the volume of notes and deposits outstanding" (p. 201).

In place of the flow of gold there may be a movement of securities repelled by a high discount rate or attracted by a low one (pp. 218-9).

Professor Taussig finds that his examples do not consistently conform to his theory of the relation of price levels to gold movements, "an initial flow of specie, subsequent movements of prices and only in the end the appropriate flow of merchandise" (p. 242). The movement of goods has to respond to the state of the balance of payments as affected, *e.g.*, by international loans. It would seem to be "only some sort of roundabout process, some disturbance or readjustment of monetary and price conditions, that could lead to the movement of goods. Being roundabout, one would suppose that it would take time and yet it appears to require practically none."

Has not Professor Taussig at this point followed the Ricardian tradition a little too closely? His account of the effect of gold movements on the price level through the discount rate assumes that the banks will only take action when a gold movement actually

occurs. But that is not so. For a long time before 1914 it had been the practice of central banks to be guided by the state of the foreign exchanges, and to forestall gold movements. Gold movements (other than the outflow from gold-producing countries to the others) were, when they occurred, irregular and casual; they often represented nothing but the miscalculations of central banks.

The "appropriate flow of merchandise" is brought about not by a very "roundabout process," but in response to a regulation of credit, to which the volume of demand is extremely sensitive. A contraction of demand repels imports, an expansion attracts them. There need not even be any very noticeable change of prices, for the prices of exportable and importable commodities are determined in world markets. Internal prices will be affected but not necessarily at once; and the promptitude of the response of imports and exports to demand does not depend upon the promptitude of the response of internal prices.

The case where countries trading together have a common metallic standard is in reality less general than the case of inconvertible paper currencies. The former is logically subsequent to the latter, and can be derived from it by introducing the assumption that the currency of one country is "pegged" in relation to that of another. Professor Taussig treats a pegged exchange and a gold exchange standard as expedients arising out of inconvertible paper, and consequently neglects their essential identity with the gold standard.

It is hardly necessary to say that there is much else, besides the monetary side of his theory, in Professor Taussig's book which is of great interest and value. In particular, a valuable investigation of the "terms of trade" for the countries selected for illustration may be mentioned.

R. G. H.

3.—*Shipping Problems, 1916-21*. By W. Palin Elderton, C.B.E., F.I.A. vi + 68 pp. London: A. and C. Black. 1928. Price 3s. 6d. net.

Cyclical Fluctuations in the Shipping and Shipbuilding Industries. By F. Cyril James, B.Com. (Lond.), M.A., Ph.D., Assistant Professor of Finance in the University of Pennsylvania. 91 pp. Philadelphia: Westbrook Publishing Co. 1927.

Mr. Elderton was statistical adviser to the Ministry of Shipping from 1917 to 1921, and in this little book he recounts the statistical problems which confronted the Ministry in its efforts to make the most efficient use of the British shipping available. The demands of the Navy for auxiliary vessels, the requirements of the Army for special supplies, the need for satisfying the most urgent demands of our allies, caused the general problem of utilization of shipping for civilian needs to vary from month to month, and the prosecution of the German submarine campaign introduced a doubtful factor of which all that one knew at any moment was that it was of grave importance and might become decisive. To make forecasts of probable supplies in such circumstances was, consequently, a task of almost unexampled difficulty, and Mr. Elderton and his staff are,

consequently, to be highly complimented on the amount of success which they achieved. Looking backwards now in peace and leisure it would no doubt be possible to criticize some of the methods adopted, but that would be an otiose indulgence. The present writer was engaged at the same time on a similar task to Mr. Elderton's, and remembers well the difficulties of forecasting supplies within a much more limited field than that with which the Ministry of Shipping had to deal. He has a vivid recollection how, as soon as a programme for three months had been drawn up after the most anxious scrutiny of all the information available, it immediately began to go to pieces, through losses of ships, accidents to ships, new Admiralty orders for diversion, strikes in foreign ports, and so on. Nevertheless, the programmes were not useless, because they enabled the administration end of the organization to know when to procure fresh cargoes or acquire more ships. It was a good example of the application of statistics to an urgent practical problem, and Mr. Elderton was engaged in similar work of wider scope. After one's bitter personal experience, however, one may be pardoned the wish that Mr. Elderton had shown us some more of his working papers, so that we might see where untoward events forced his plans to break down and also what steps were taken to repair the damage.

Mr. Elderton suggests that the Board of Trade should give the weight of goods imported and exported month by month. For his special problems in war-time such a measure was no doubt of some use, since he was dealing mainly in heavy cargoes usually recorded by weight. Even so, weight of total imports and exports is of limited value as a measure of trade, for different commodities have very different stowages. From the point of view of the shipowner the optimum condition is reached when his ship is "down to her marks" and at the same time all her cargo space is occupied, but this condition is seldom fulfilled. Most important commodities are recorded by weight on importation or exportation, though some are recorded by other measures, and a relative few by value only. The point insisted on here is that to add together a ton of coals, a ton of apples, a ton of electrical machinery, and a ton of cotton piece-goods contributes no useful information, and no certain conclusion can be drawn from it as to the manner in which the stowage capacity of ships is being utilized.

Mr. James's essay on the cyclical fluctuations of shipping and shipbuilding has one very serious defect: almost all the charts in it are unreadable. They have evidently been photographed down from large-scale originals on heavily cross-ruled paper, with the result that in the reduced form the curves are obscured by the cross-lining, the legends are almost unreadable, and the marginal notation of dates, etc., has practically disappeared. It is so easy to produce good readable charts that the neglect to do so is unpardonable. To criticize properly his work would entail that the reviewer should redraw the charts for himself, and that does not conduce to a kindly attitude towards the author. In the period 1880-1925 the author claims that in shipping "there has been shown to have existed four

distinct cycles which reached their peaks in 1887-9, 1899-1900, 1905-7, 1912-13, and 1918-20. The first of these cycles occupies a complete decade, but each of the remaining three completes itself within six years, and it is probable that this may be taken to be the approximate duration of the shipping cycle. Following regularly at an interval of about four years we have the peaks of the intermediate cycles in 1894-6, 1902-3, 1909-10, 1916-17, and 1922-24.

The demonstration is not convincing. Shipbuilding must necessarily depend on the prosperity of the shipping industry, and shipping on the activity of overseas trade. The movement of shipping is, however, a complex of the voyages of "tramps" which move from area to area according to the briskness of trade, of cargo liners which are tied to particular routes, of passenger liners which carry little cargo, of mixed passenger and cargo liners, and of special vessels, like oil-tankers, tied to special kinds of goods. Besides, over the period under discussion tramp shipping has been declining and cargo liners have been increasing in relative importance. The meaning of the conception "shipping cycle" seems to be very doubtful, and it is questionable whether the application of elaborate mathematics to the analysis of the statistics of entrances and clearances of shipping gives absolutely conclusive determinations. H. W. M.

4.—*Railway Statistics, their Compilation and Use.* By A. E. Kirkus, O.B.E., M.Inst.T. xi + 134 pp. Svo. London: Pitman.

The Railways Act, 1921, has been rather inexactly described as making the public, the railway shareholders, and the railway staff partners in the railway undertakings of this country. What it actually did was to establish a Rates Tribunal whose duty it was to make such charges as would provide the aggregate net revenue of the year 1913, subject to efficient and economic management, and Central and National Wages Boards to deal with all questions relating to rates of pay, hours of duty, and conditions of service of the railway working staffs and clerks. The Rates and Wages Tribunals are not connected in any way.

The charges fixed by the Rates Tribunal commenced to operate on January 1, 1928, and come up for review at the end of the year. The course which will be taken in the event of their failure to provide the standard net revenue of 1913 remains to be seen, but there are obviously only two parties really interested, the public who pay the charges and the railway officials who provide the efficient and economic management.

In these circumstances the provision of adequate statistics of railway operation in a form which the railway executives can use and the travelling and trading public can readily understand is of first importance.

Prior to 1913 the accounts then issued half-yearly by the railway companies to their shareholders gave a few statistical tables of the most meagre kind, and these accounts and returns were summarized for the information of the general public in the Annual Railway Returns issued by the Board of Trade. In response to the unceasing

criticism of the late Sir William Acworth and other Fellows of the Royal Statistical Society, the Department in 1906 appointed a Committee to report on the form and scope of the accounts and returns to be prepared by the railway companies under the Railway Regulations Acts. The recommendations of the majority of that Committee were embodied in the Act of 1911 and first took shape in the accounts for the year 1913. Sir William Acworth, who was a member of the Committee, with two other members attached a reservation to the report, arguing for the compilation and publication of ton miles, passenger miles, wagon miles, carriage miles, and engine hours to be made statutory. This was not then granted, but the war changed the whole railway outlook. The teaching given to the railway students by the London School of Economics and similar bodies began to bear fruit, whilst with the advent of the Ministry of Transport in 1919 and the passing of the Railways Act, 1921, what had been matters of statistical interest only to the general public became possibly of direct monetary importance, and the statistics of operation which were refused in 1913 became statutory in 1921. The railway companies, by collaborating with the Ministry in the preparation of elaborate detailed instructions regarding the uniformity of their compilation, assisted to make these new statistics of value to all parties using them.

Mr. A. E. Kirkus, the Director of Statistics in the Ministry of Transport, has in this little book set himself the task of describing for the information of students of railway transportation these Ministry of Transport statistics which are published monthly, and the statistics prescribed by the Act of 1911, all being summarized in the annual publication of the Ministry, the Railway Returns. His association first with the old North Eastern Railway and then with the Statistical Branch of the Ministry from its foundation guarantees the accuracy of his work. Its lucidity is especially praiseworthy.

Perhaps not unnaturally Mr. Kirkus permits himself but few references to lines of development in our railway statistics. The inadequacy of the wheel type as a basis for scheduling the various classes and numbers of engines owned by each railway company and the necessity for revising Return II (*a*) in the published accounts by some measure of tractive effort is admitted. The incompleteness of Return II (*e*), the number of merchandise and mineral vehicles owned, which fails to show the gradual increase in average wagon capacity, has been met by the Ministry by the demand for special returns, the figures of which are incorporated in the Annual Returns.

As already stated, one of the early acts of the Ministry of Transport was to work out with the railway companies a very detailed set of instructions to ensure uniformity in the compilation of the operating statistics. The same necessity for uniformity exists in connection with the Railway Accounts summarized in the Annual Returns, as was recognized by the Departmental Committee of 1906, who advocated the appointment of a permanent Standing Committee to decide points arising in connection with the preparation of the accounts and statistical returns. This advice was not acted upon, but

Mr. Kirkus refers briefly to the work of a Statistical Committee of the Railway Clearing House in this connection. We should have liked to have heard more of the work of this body and to know to what extent the American practice of classifying expenditure according to standards applicable to all companies has been followed.

What may be called the battle for the ton-mile no longer rages so fiercely as in the early years of the century, but it can only be said to be won when railway statistics are examined regularly for information rather than for illustration. If, however, railway executives are to frame policy more largely on statistics, those figures must be available to them much more speedily than now—monthly figures three months after date and annual figures seven or eight are not early enough, and it is hoped that in a future edition of his valuable little book Mr. Kirkus will be in a position to tell us something of the means, mechanical or other, by which the preparation of the figures has been speeded up. If, in the meantime, he can have added to the monthly figures a running commentary on their salient points, their usefulness, both to the busy railway official and, especially, to the public, would be greatly enhanced.

In conclusion Mr. Kirkus briefly refers to what is being done in America, Canada, and on the German State railways in connection with the division of expenditure between passenger and freight services. With the full operation this year of the Railways Act, 1921, this matter ceases to be one of mere academic interest. If rates and charges are to be raised and lowered on the results of working, care will need to be taken that, *e.g.*, freight charges are not raised to meet passenger losses. Any division of expenditure cannot but be arbitrary, but this will not greatly matter provided it be continuous and uniform. But railway charges have never been in the past based on cost, but on ability of the particular traffic to pay, and it is difficult to see how any other principle can operate in the future. Mr. Kirkus foreshadows appreciable development in the future use of statistics in conjunction with scientific cost accounting and the ascertainment of unit costs, and if he can find time to elaborate this theme he will add a further service to the student of transportation by railway.

W. H. J.

5.—*Central Banks: a Study of the Constitution of Banks of Issue, with an Analysis of Representative Charters.* By C. H. Kisch, C.B., and W. A. Elkin. x + 284 pp. London: Macmillan. Price 18s.

This valuable book gives in a concise form the theory of central banking, and illustrates it with the history of the foundation and conduct of central banks, especially in the post-war years.

The theory is an expansion of the reply of the Governor of the Bank of England, when in the course of his evidence before the Royal Commission on Indian Currency and Finance he was asked to define the duties of a Central Bank:—

“It should have the sole right of note issue; it should be the channel, and the sole channel, for the out-put and intake of legal

tender currency. It should be the holder of all the Government balances; the holder of the reserves of the other banks and branches of banks in the country. It should be the agent, so to speak, through which the financial operations at home and abroad of the Government would be performed. It would, further, be the duty of a central bank to effect, so far as it could, suitable contraction and suitable expansion, in addition to aiming generally at stability and to maintain that stability within as well as without. When necessary it would be the ultimate source from which emergency credit might be obtained in the form of rediscounting of approved bills, or advances on approved short securities or Government paper."

The legal embodiment of this ideal in various countries is given by the analysis of the charters of twenty-eight central banks.

"The Bank of England stands by itself as preserving a legal freedom of action unknown elsewhere. Continental banking is represented partly by the older foundations, such as the Bank of France, the Netherlands Bank and the Banks of Norway, Sweden and Spain, and partly by banks such as the Reichsbank and the National Banks of Austria, Hungary, Poland and Bulgaria, which have either been reconstituted or newly created as a result of developments arising from the war. . . . Among the European banks will be found State banks subordinate in varying degrees to the Executive or Legislature. Central banking, as practised in the British Dominions, is illustrated by the Reserve Bank of South Africa and by the Commonwealth Bank of Australia, which is also noteworthy as combining in certain respects the rôle of a central and a commercial bank. Central banking in Asia is exemplified by Japan. A further group of charters includes the United States Federal Reserve Act and the charters of the Banks of Chile and Columbia, which to a considerable extent are modelled on the system of the United States."

The history of the practice of central banks is an expansion of the authors' comment that :—

"Theory naturally tends to attribute too much to the written statutes. It may happen that similar statutes may produce different results in neighbouring countries. It is equally possible that from very different texts far less difference may in practice emerge than a superficial examination might suggest. Particularly on such points as the relation of the State to the central bank, the actual texts require to be interpreted in the light of close and precise knowledge of their actual working. . . . The form in which it is usual for central banking principle to be enshrined is only the initial step to wise banking conduct."

Thus "as regards the older central banks, it must always be remembered that though the charters may seem unduly wide the practice of the banks is in advance of their regulations, and that in working they rigidly eschew many classes of business that could be brought within the range of their permissible activities as technically defined. In the case of the Bank of England, where banking, as distinguished from note-issuing, operations are virtually unrestricted by law, it is probably true that if a charter were drawn up in the light

of actual practice, it would, allowing for the special conditions of the London money market, conform in regard to loan and discount operations to what compliance with central banking theory requires and with the actual prescriptions of the more recent statutes."

The authors find space to touch on many interesting problems (such, *e.g.*, as how a fixed fiduciary issue may be harmonized with an elastic credit control), and this makes their work the more stimulating. They are greatly to be congratulated on having given so compendious an account of the problem of central banking in its ramifications. In so doing they supply a growing want and have performed a difficult task with distinction.

H. M. L.

6.—*Modern Monetary Systems*. By Bertrand Nogaro. London: P. S. King. 1927. Price 15s. net.

M. Nogaro has played an important part in French academic and public life, and views monetary problems from a different angle from that favoured by the main British schools of thought. His book is therefore extremely stimulating.

The book falls into three main parts. The first deals with modern monetary systems, and while it is in essence historical and deals with well-known facts, it places several of them in a new light. The section on Czechoslovakia is of interest because it deals with a piece of history which has been rather neglected. The second part is more theoretical, and the author opens it by crossing swords with the more orthodox exponents of the quantity theory.

The third part of the book is concerned with stabilization plans. The impression left on the reader is that the author is rather too much obsessed with the difficulties of stabilization, though perhaps this is rather an unfair attitude to be adopted by a reviewer who is writing after the successful stabilization of the mark, the lira, and the franc. Still, it is not easy to accept as valid his attack on Ricardo on p. 214. It may be that, as he says on the following page, although fluctuations in the volume of metal currency are normally very small, they occur at the apex of the inverted pyramid of credit, and so their effects may well be considerable. It will take more than this to nullify the theories of Ricardo. His claim that the main factor in bringing about equilibrium will be found at the present day in movements of capital has perhaps more substance in it, though we would remind him that according to official figures imports into the United States were around 4,000 million dollars, against new American investments abroad of only 1,600 millions. His proposal for an international credit institute was never practicable, and, as recent events have shown, was unnecessary. Finally, he writes rather loosely of the gold exchange standard, and it is not always clear whether he is referring to the gold exchange standard as it was understood in India before the war, or to the gold bullion exchange standard, which exists in England to-day, or to the form of the standard where Central Banks can discharge their liabilities in either gold or gold currencies. In short, although

the book is valuable, in that it regards monetary, problems from what is in England a new angle, this does not mean that the new angle is invariably a better one. N. E. C.

7.—*The Migration of British Capital, to 1875.* By Leland Hamilton Jenks. xi + 442 pp. New York and London: Alfred A. Knopf. 1927. 18s.

One of the chief dangers of economics is its tendency to hide the realities of human affairs behind a veil of abstraction. Nowhere is that tendency more pronounced than in the average study of the export of capital. We constantly read that, say in 1923, Britain's net export of capital amounted to some £180,000,000, but as a rule we do not pause to consider what was the machinery of transfer, or what were the negotiations between what lords of finance, which took British capital in the form of goods made by dwellers on Tyne-side and Clyde to far countries and strange men. Read the figures and you are in the realm of almost perfect abstraction; roll back the veil, and the rich variety of human intercourse lies before you with its countless facets, its hopes, its disappointments, its wealth and poverty, its happiness and its despair.

Particularly rich in this variegated humanity is the history of the export of British capital in the first three-quarters of the nineteenth century. In the sixty years from 1815 to 1875, Britain's export of capital amounted to about £500,000,000. At the latter date her foreign investments totalled some £1,200,000,000, of which about £500,000,000 were in foreign Government loans and guarantees, £240,000,000 in railways in Europe, the United States, and South America, £200,000,000 in the United States, £90,000,000 in Indian railways, £70,000,000 in Indian debt, and £50,000,000 in Colonial Government loans. These figures rest on the best estimates at present available.

How were these investments achieved? It is on this topic that Professor Jenks has written a particularly captivating book. He describes the machinery of foreign investment and discusses the lands where British enterprise took British capital and stimulated economic development. Professor Jenks passes from the scarcely more than embryonic financial world which existed after the Napoleonic wars—when London was almost dominated by Rothschild and Baring—through the manifold changes which led to the complicated and far-flung financial structure of the late 'seventies. He shows how nation after nation, from Europe to Australia, and from the Americas to India, was fertilized by the stream of British capital.

One of the most fascinating episodes was that of the railway contractors, and of these giants the greatest was perhaps Thomas Brassey. Professor Jenks gives a particularly vivid picture of that Drake of enterprise: "To ensure the material with which to carry out his undertaking he built iron works and rolling mills. He had a locomotive and carriage works at Rouen, France, in the name of Buddicom, his partner. With William Jackson he built another

at Birkenhead. He financed more than one banking house as a means to secure emergency credit. Eighty thousand men were at one time in his employ. English schools, priests, chapels and physicians followed their migration from one contract to the next. To keep such an organization employed, agents and partners roved the commercialized world seeking opportunities and concessions. At one time Brassey had railways and docks under construction in five continents. Every country in Europe possesses a specimen of his craft, with the possible exception of Greece, Albania and Finland. In his thirty-five years of business life he was engaged upon one hundred and seventy different contracts, involving nearly eight thousand miles of railway."

Brassey's tale is a stirring tale; so also is the whole tale of British overseas investment; and for present-day Britain an instructive tale. Are we at the end of an epoch? Or can we rely upon the qualities which brought success and wealth in the nineteenth century to raise us, in changed conditions, out of the slough of depression in which we have lain for the last eight years? Professor Jenks does not answer the question, but in his vivid account, written in clear, nervous, energetic English, are to be found materials for judgment, for instruction, and perhaps also for hope. J. M.

8.—*The British Employment Exchange.* By John Barton Seymour. x + 292 pp. London: P. S. King. 1928. Price 12s.

This book consists almost entirely of a detailed description of the British system of National Employment Exchanges, of the work they ordinarily perform, and of the various additional duties which have from time to time, and especially during the war, been placed upon them.

It must at all times be difficult for a writer, intent on giving a full account of such an elaborate organisation as the Employment Exchanges are, to decide where to stop in the statement of detail, but the book seems to enter unnecessarily into trifling matters of procedure. So much so, in fact, is this the case that it may perhaps be wondered whether the officers of the Ministry of Labour would need much more in the matter of instructions, although it can be gathered from the book that much more precise instructions are available.

After a preliminary chapter on Employment Exchanges and the introduction of the National System the author devotes two chapters to the work of the exchanges during the war and the demobilisation period. The account is complete, and though perhaps a trifle laudatory gives a good idea of the important and varied duties assigned to the Employment Exchanges during the period and successfully performed by them. Perhaps the most trying and tiresome duty was that of dealing with labour from foreign and allied countries, especially when the results, obtained or obtainable, were considered. We seem to remember the trouble with the Portuguese timber-fellers on the question of their daily ration of wine. They got it ultimately, we believe, but the particular brand of port supplied

was never disclosed. Too great stress is laid on the hindrances to placing of unemployed applicants due to the demands of other duties, especially the administration of unemployment insurance, at a time when the numbers out of work are heavy. During a time of bad trade the jobs that are vacant can be rapidly filled either through the Employment Exchanges or by direct engagement. Although at the present time the number of discharges and of engagements of workpeople are heavy (averaging perhaps 150,000 per week), in all probability the numbers in a period of good trade would be considerably higher. At least that is the impression made by the figures relating to the then insured trades in the two years before the war. Moreover, workers are much more ready to leave their employment when trade is brisk and prospects good, and it is therefore when labour is in fair demand or has to be looked for outside the immediate locality of the demand that the real trial of the capacity of the Exchanges in "placing" work will come. Separate chapters are devoted to the Organisation and Procedure at the Exchanges, seasonal and casual labour, juvenile and women's employment. A few misconceptions can be noted. The unemployment books are not issued or re-issued from the Claim and Record Office (p. 75), but from the Exchanges and Branch Offices. To do so centrally would be practically impossible in the time available. Nor is the Statistics Division of the Ministry of Labour stationed at the Record Office, but only that branch of it which deals with most of the unemployment statistics of the Ministry (p. 75). All insured seamen have when unemployed to register at Exchanges or Branch Offices of the Ministry, even if they sign daily at Mercantile Marine Offices as evidence of unemployment (p. 163). It is doubtful whether the extra expense incurred by the authors' suggestions of Employment Exchanges for special trades and industries could be justified. It is one of the arguments against insurance by industry that it would mean a multiplication of Exchanges and much overlapping, and even as regards industries which could be fairly closely defined the entrances and exits of workers are quite considerable, especially among the unskilled. The case for the London Building Trade Exchange rests on an entirely different argument.

The author makes twelve principal suggestions for the development of the Employment Exchanges. Among them are the "compulsory registration of vacancies." Apart from power to compel employers to take their labour through the Exchange this does not seem of much value except from a statistical point of view. But a wide extension of statistical work is advocated, although the demands set out in the chapter on Statistics are so enormous that the author can hardly have considered what the statistics would show, or indeed whether many of them were possible to obtain. It is the collection and tabulation of unemployment statistics, for instance, that involve the greatest expense and not the publication (p. 223). The Ministry of Labour appear at present to restrict their statistics as much as possible to those obtainable in the course of administration, and their position is quite intelligible. What the author requires would

certainly cost £100,000 per year at the least. Nor is it possible, as the author would like, to extend the present insurance scheme to agriculture and domestic service. The small amount of unemployment in both these occupations and the low wages in the former of them would make it inequitable to demand of them a contribution as large as that required from those now insured.

Questions of the unification of social insurance and of the extent to which the Poor Law should be used to relieve industrial unemployment demand more space than Mr. Seymour has been able to spare, and raise many other and more difficult problems than he has referred to.

There is a fairly complete bibliography, but the volume referred to on p. 12 does not seem to be included. W. A. B.

9.—*The Prosperity of Australia: an Economic Analysis*. By Frederic C. Benham, B.Sc.(Econ.), Lecturer in Economics at the University of Sydney. London: P. S. King. 1928. Price 12s. 6d.

Data for estimating the national income of Australia are fairly reliable, for, although the existence of a large proportion of agricultural income presents difficulties, and there is little to be gathered regarding the so-called "intermediate class," income-tax statistics are comprehensive, wage statistics can be checked by reference to current wage regulations, and the estimate as a whole can be corroborated by reference to the official census of wealth taken some years back. Mr. Benham's estimate is £635 million (£108 per head) for 1924-25, a figure which, all things considered, is probably too low.

A series of tables leading up to an index of average real income per head of population provides an interesting feature. These are based upon official statistics of (recorded) production (which, although admittedly incomplete, are supposed to preserve a constant relation to total production), adjustments being made to allow for price changes, profits upon foreign trade, and external interest payments. Whilst the methods employed are somewhat bold in places, the principles are fundamentally sound, and the results as a whole provide an interesting commentary upon modern statistical methods of determining industry's capacity to pay.

Practical conclusions are that Australia's progress since the war has been unduly slow, and that her backwardness is attributable to Government policy in the matters of protection and wage regulation. It is further argued that most of Australia's external borrowing has been effected for productive purposes and that current allegations as to over-borrowing are unfounded.

Mr. Benham's general line of treatment does not suggest familiarity with the details of industrial administration, and his conclusions, although backed by statistical evidence as far as it will reach, strike one as bald and unconvincing. L. R. C.

10.—*The Economic Impact of America.* By the Hon. George Peel. xiii + 331 pp. London: Macmillan. 1928. Price 10s. 6d.

"If it is indisputable that the United States has secured the right to extract from us during the next two generations a stupendous annual tribute of our wealth; if she is making a resolute attempt to oust from the neutral markets those exports of ours whereby we live; if she is planning to be quits with us in shipping; if she is resolved to exclude our goods by an inexpugnable tariff wall; if she is ambitious to wrest from us the golden sceptre of finance—then, assuredly, there are not many subjects in the material order more worthy of our attention than *The Economic Impact of America*" (p. 14).

There is much virtue in an "if." In the course of Mr. Peel's clever and stimulating book each of these five hypothetical propositions in succession is subjected to criticism. In each case something remains standing, but the naked horror of the proposition is mitigated.

Broadly, the mitigation may be summed up in the single principle that there is room in the world for both. American manufactured exports are great, but they are only to a limited extent competing with ours. The tariff is in many directions prohibitive, but there are important classes of British exports which have a sufficiently specialised market to pass over it.

In shipping the American venture has not been altogether successful. If our position has relatively deteriorated that is not exclusively due to American competition. Of the future Mr. Peel is hopeful.

On the subject of the War Debt he has little comfort to offer us. He is content to quote the Memorandum which issued from Columbia University in 1926.

Finally, Mr. Peel turns to monetary policy and this leads him to his concluding chapter—"Compact—not Impact." It is in the region of finance that there emerges most clearly the future opportunity for America and England to co-operate. Money is essentially international. An impressive array of quotations from financial leaders is assembled both recommending and predicting co-operation between London and New York.

It would be an injustice to the book to omit reference to the historical chapters which form the first half of it. Here is traced the development of the economic impact from the eighteenth century up to 1914 and through the War and post-War period. Mr. Peel's historical imagination depicts for us the essential continuity of the development. He links up the situation of the present day with that in the nineteenth century. Incidentally he shows that the English have again and again feared the economic impact from across the Atlantic, and have as often found their fears groundless or at any rate misconceived.

The book is not of impeccable accuracy. It is a mistake to measure manufacturing production by *gross* output (p. 109), which

includes the value of materials used and much duplication of partially manufactured goods.

It is not correct to convert the expenditure of France on reconstruction into sterling at the exchange of 1927 (pp. 206-7). A far higher result would be obtained if the francs were reckoned at their value at the time when they were spent (e.g., in 1919-1922).

It is not true that an income tax was not established in the United States till 1916 (p. 38). It was imposed in the Civil War, and it was only on its revival that it was declared unconstitutional in 1894 (p. 40).

R. G. H.

11.—*Russian Economic Development since the Revolution*. By Maurice Dobb, M.A., Lecturer in Economics in the University of Cambridge, assisted by H. S. Stevens. xii + 415 pp. London: Routledge. 1928. Price 15s.

"To pass judgment on contemporary history becomes as rash a task as to herald a prophet in his own village," says Mr. Dobb, in setting out, undeterred, on his journey through the jungle of Revolutionary Russia, and trying conscientiously to pick up the essential from a mass of detail. He begins with an outline of the political background of the Revolution, and then follows its development from the first struggles of the Communist Party against the Provisional Government in 1917, down to the recent dissensions among the ruling Communists, arising out of their efforts to build up the economic and political system of a Socialist State on a permanent basis. The author is clearly in sympathy with the ultimate aims of the Russian Communist revolution, but he succeeds in treating his subject with, on the whole, commendable impartiality. The substance of the book, accordingly, though it may not appeal to the man in the street, who wants more colour in a good story, is decidedly a valuable contribution to the literature on the subject. The account of economic developments in Russia since 1918, indeed, is unquestionably good. It would be improved, however, by being projected against the historical background out of which the revolutionary movement had actually originated: an historical background absolutely essential for the proper appreciation of the events and tendencies of to-day.

In this respect, unfortunately, this otherwise excellent book suffers from a complaint only too common among the students of modern Russian developments: namely, the lack of sufficient historical grounding, which is replaced, generally, by a few entirely inadequate and often erroneous generalizations and formulæ. In Mr. Dobb's book, the thoroughness of treatment accorded to the contemporary phase of Russian history is in striking contrast with the slightness of the historical background, which appears to have been picked up casually from stray works of more or less partisan writers. His references, practically confined to foreign writers of very different standing, among whom one vainly looks for such a classic, for instance, as Wallace, not to speak of a single work by any of the great Russian historians, confirm the

impression that the necessity of acquiring complete familiarity with the historical background of the events dealt with had not been sufficiently appreciated by the author. Indeed, some statements of fact which play an important part in the reasoning of the author are entirely misleading. Such is the case, for instance, with Mr. Dobb's reference (pp. 67-68) to the "commutation of feudal services" of the peasants at the beginning of the nineteenth century. For lack of exact information, which could easily be acquired by the study of some standard work on Russian history, the author would appear to have proceeded here by analogy with Western Europe, which is a very dangerous path to take in dealing with the social and economic evolution of Russia during the last 200 years. Otherwise, he would have learned that the *obrok*, in kind or money, was the oldest and the more general form of the peasants' payments to their masters, and that, differing from Western Europe, it was precisely the labour services that developed later, since the close of the eighteenth century, under the influence of the development of large farming by the "spirited landlords" of the time. In the early part of the nineteenth century, far from money payments becoming general, increasing numbers of serfs had their former money dues turned into labour services. The statement on pp. 341-2, concerning the outstanding social and economic development of the years immediately preceding the revolution, namely, the peasant enclosure movement, reveals that the author had hardly done it the honour of study, since to say, as he does, that the peasants who enclosed their holdings were, as a rule, the richer peasants, is entirely misleading. In fact, as a glance at the relevant statistics would show him, it was typically a movement involving in the main the average peasant-farmer.

In the analysis of the conditions and of the policy of the Soviet Government, the author would appear to avoid the crucial issue of whether and, if so, to what extent, the recurring troubles and economic crises of the recent years have been due to the principles on which the present-day economic system of Russia is based, as distinguished from extraneous causes. For Mr. Dobb, the survival of the system of State capitalism and the measure of success achieved in raising Russia from the "slough of despond" into which she was thrown by militant Communism, are incontrovertible evidence of the inherent soundness of the system and its superiority over what he refers to as the *laissez faire* of the capitalist world. That the economic organization of Soviet Russia proved to possess much greater vitality than it had been credited with is certainly true. But the extent to which this was due to the soundness of State capitalism, and not to the fact that the privileged minority of industrial workers, as well as the whole of the State-controlled industry, had been able, so far, to sponge on the peasant majority, remains an open question. To this Mr. Dobb fails to give any definite answer, though he broaches the subject in dealing with the Communist Opposition. Meanwhile, in Russia, with its peasant population, it is the worker on the soil, the hardest worked of all,

who is entitled to call the tune, and if, as Mr. Dobb admits himself, his standard of life has been lowered, while that of the industrial worker has risen, the system is hardly a sound one for Russia. Mr. Dobb looks on Russian developments from the point of view of, to use his own words, "the exploited proletarian"; the reviewer is more inclined to look at it from that of the sponged-upon peasant-farmer. In Russia it is the prosperity of the latter that makes or mars that of industry and its workers, and no social system can be considered sound which bases the well-being of the towns on the exploitation of the peasantry. While industry and agriculture are necessarily complementary to each other, the balance of interests must be maintained.

These are the few criticisms called for by an otherwise valuable contribution to the social and economic history of modern Russia.

G. A. P.

12.—Other New Publications.

American Philosophical Society. The record of the celebration of the 200th anniversary of its foundation, held at Philadelphia April 27 to April 30, 1927. Proceedings. Vol. 66. xiii + 750 pp. Philadelphia, 1927.

[The volume includes the numerous scientific papers that were read or presented at the general meeting, a list of the Delegates, and an account of the origin and activities of the Society.]

Economic Forces of the World. Published by the Dresdner Bank, Berlin. 145 pp. Berlin, 1927.

[A compilation of statistical tables drawn up by the Economic Department of the Bank, their object being to demonstrate the importance of those economic factors which, since the war, have caused the greatest changes in the world's economy. The tables include the latest statistics of the production and consumption of the world's raw products, of the industrial sources of energy, of the chemical industries, of foreign trade and shipping, and of other forms of traffic.]

Esthonia. Agriculture en Esthonie. Album Statistique. 112 pp. 1a. fol. Tallinn: Bureau Central de Statistique de l'Esthonie, 1928. Price Kr. 7.50.

[This well-produced publication gives a statistical account of the present state of agriculture and cattle-raising in Esthonia, and of the progress made during recent years. It is the third and last volume of a survey of the country, the first two sections of which dealt respectively with territory and population and with general economic conditions. There are numerous cartograms, diagrams and illustrations.]

Foster (W. T.) and Catchings (W.). The Road to Plenty. vi + 231 pp. Boston and New York: Houghton and Mifflin, 1928.

[In this book the authors present their account of a method by which consumers' income might be increased so as to make possible the absorption of the full amount of goods which producers are capable of supplying. The plan emerges in the course of conversations during a railway journey between representatives of various occupational and mental types—a Professor, a Business Man, a Congressman, a Salesman, and so forth. The Business Man is responsible for the plan of salvation, while the rest present

intelligent objections for him to refute or queries which elicit explanations. The method of escape from what the authors have named the "dilemma of thrift" is, briefly, that of a controlled flow of money—the control in this instance being designed to stabilize prices, beginning at the retail end, by regulation of the income available for spending purposes, especially so as to eliminate the time lag caused by the delay in the transformation of savings into effective spending power. The control would be in the hands of the Federal Government as the largest operator in the market (the book is directly concerned only with conditions in the United States), which would time its financial operations and constructive large-scale expenditure so as to regulate the amount of purchasing power in the hands of consumers in accordance with the prospects of trade. The knowledge required for appropriate action would be based on scientifically constructed indices.]

Halasz (Albert). *New Central Europe in Economical Maps*. 149 pp. Budapest: R. Gergely, 1928.

[The maps in this volume show the locality of the principal industries, the condition of agriculture and live-stock, and the inter-state circulation of products, and are especially intended to make clear the economic effects of the alterations in frontiers which took place as a result of the war. The volume has been compiled on the lines of an earlier work dealing with Hungary, issued by M. Halasz in 1919. Numerous statistical tables are included.]

International Labour Office: *Studies and Reports*. Series M (Social Insurance), No. 6. *Compulsory Sickness Insurance*, xvi + 794 pp. Geneva and London: P. S. King & Son, 1927. Price 12s.

[This volume, compiled in accordance with a resolution of the 1925 session of the International Labour Conference, is a study of the main aspects of compulsory sickness insurance in the countries where it is in force. The subjects discussed include the variations in the classes of workers covered, the nature and extent of the benefits, the finance of the various schemes in force, the machinery for the settlement of disputes, and the position of foreign workers where possible; statistical data for each of these subjects are given for a pre-war period and for the years 1920 and onwards. A list of the principal legal texts and documents used in compiling the report is given in the appendix.]

International Labour Office: *Studies and Reports*. Series M (Social Insurance), No. 7. *Voluntary Sickness Insurance*. Collection of National Studies (Laws and Statistics). xlviii + 470 pp. Geneva and London: P. S. King & Son, 1927. Price 8s.

[This study, compiled for the 1927 session of the International Labour Conference, is a companion volume to that on compulsory sickness insurance. It is a collection of monographs dealing separately with those countries in which voluntary insurance exists in some form or other, the scope, benefits, and finances of the different schemes being set forth with statistics of their working. The volume is a useful record of the working of voluntary insurance throughout the world.]

Jones (Evan). *Some Contributions to the Economic History of Wales*. 197 pp. London: P. S. King & Son, 1928. Price 9s.

[The book falls into two parts. The first consists of a series of monographs on the principal industries of Wales from their inception to modern times, and their influence in transforming an agricultural into an industrial community. The second portion of the book includes an account of labour conditions during the period of the Industrial Revolution, the agitation for political reform, and a study of the changes in the distribution of the population brought about by the changes in economic conditions. There is a bibliography and an index.]

Kann (Eduard). The Currencies of China. An investigation of silver and gold transactions affecting China, with a section on copper. 2nd edition, revised. xxxiv + 562 pp. London: P. S. King; Shanghai: Kelly and Walsh, 1928. Price 30s.

[The establishment of a Republic in China has brought about great changes in its monetary system, and this book, the first edition of which appeared in 1926, gives a clear account of them. The author has spent many years in China as a banker and merchant, and thus claims authority on the subject. The book deals only with metallic currencies, which, in the author's words, are the "backbone of China's monetary system," because they alone lend themselves to direct international arbitrage transactions. There is a section for each of the three metals: silver, gold, and copper. A brief historical note on the use of each of these metals in China and their present position in commerce and finance is included. Though silver is China's most important medium of exchange, gold is extensively used, and copper is still the main currency for the general masses of the people. The book contains numerous formulæ for use in connexion with the moneys and exchanges of the Far East, also a glossary of banking terms, and an index.]

League of Nations. Health Organization. Studies of Cholera in Japan. By *Rokuro Takano, Itsuya Ohtsubo and Zenjuro Inouye*. 121 pp. Geneva, 1926.

[The compilers of this brochure are, respectively, the Chief of the Section of Preventive Medicine, Central Sanitary Bureau, Home Department, an Associate Member of the Kitasato Institute for Infectious Diseases, and an Assistant of the State Institute for Infectious Diseases, and their task, undertaken for the Health Organization of the League of Nations, has been to summarize, in English, the more important of the immense number of published works on the subject of cholera in Japan. The disease is not endemic in Japan, but arrives in the summer by sea from China and India, subsides in the cooler weather and dies out in the winter. Epidemics were formerly rare, but became frequent with the development of foreign communications, and in only five out of the last fifty years has the country escaped an outbreak. Consequently the Japanese have devoted much time and labour to the study of the possibilities of prevention and cure, and their researches have produced some valuable results, which it is the purpose of this publication to make available to workers in other countries. The first eight chapters deal with the morphology of the cholera vibrio, culture media, vaccines, sources of infections, etc. Chapter IX consists of clinical studies, and Chapter X is an account of cholera epidemics in Japan, their history and epidemiology, with tables of the monthly distribution of cases and deaths, 1877-1925, and a chart showing the geographical distribution.]

Mehta (N. B.). Indian Railways: Rates and Regulation. With an Introduction by W. Tetley Stephenson. 188 pp. London: P. S. King & Son, 1927. Price 10s. 6d.

[A careful study of railway administration in India, with special reference to railway rates and fares and to the principles which should regulate their application in practice. The author is of opinion that state control is at present inadequate and unable to deal with the undue discrimination in the imposition of rates of which there is frequent complaint. As a remedy, he suggests the appointment of a standing Railway Rates Advisory Commission. There is a bibliography and an index.]

Nitti (Francesco). *Principes de Science des Finances*. Traduits de l'Italien par *Stefan Freud*. 2 vols. Paris: M. Giard, 1928. Price 100 frs.

[This is a translation of the 5th edition of Prof. Nitti's book (originally published in 1903) which was so extensively revised in the light of the author's later experience as Minister of Finance and as Premier of Italy, as to be practically a new work. These volumes, which total over 900 pages, cover the whole field of public finance, discussing its theory and describing its practice. The subject is treated in five books: Public Expenditure; Ordinary Revenue; Extraordinary Receipts; Preparation of the Budget; Local Finance. The most elaborate of these is the second, which is chiefly concerned with the various forms and methods of taxation. No index has been provided, but there is a detailed table of contents, almost as useful in a work of this particular kind.]

Pitman's Dictionary of Industrial Administration. Edited by *John Lee*. Part I. 48 pp. London: Sir I. Pitman & Sons, Ltd., 1928. Price 1s. 3d. net.

[This is the first instalment of a work which is to appear in about thirty parts, and is apparently intended to be an encyclopædia covering all subjects relating to the organization and management of industry. The list of contributors includes many names which are guarantees of expertise in their special subjects, and among the articles in this part are: Accidents (about 13 columns, founded upon thoroughly sound and well-known studies, a list of which is given in the bibliography appended); Administration and Organization, function of (with subdivisions such as *Management*, *Co-ordination*, *Personnel*, and *Over-organization*); Bonus Payments and Borrowing; examples of cross references are "Boredom (see Repetitive Work)"; and "Approved Society (see Health Insurance)." The Editor contributes a preface surveying and explaining the scope and aims of the publication.]

Pitman's Economic Educator. Edited by *Prof. J. H. Jones*. Part I. 48 pp. 4to. London: Pitman, 1928. Price 1s. 6d.

[The name of the Editor offers a guarantee of the soundness of the economic instruction offered in this publication, which has been issued in thirty parts at fortnightly intervals. In his preface, Professor Jones explains that "Economics has been interpreted broadly and is divided into sections of subjects each of which is presented in serial form"; those which require lengthy treatment run through twenty-nine issues, others are completed in the first or the latter half, approximately, of the serial parts. (Part 30 was planned as a discussion of the probable economic future of this country.) This serial treatment enables the student to pursue several courses of study simultaneously, and is no doubt a convenient one for its avowedly educational purpose, but will hardly, we think, result in a very convenient volume for reference when the whole is bound. The main principles of economics are treated in four series: Production, Distribution, Currency and Banking, and International Trade. Among the articles in the first issue are Economic History and Development, by Professor J. F. Rees; The Geographical Basis of Industry, by Professor L. W. Lyde; Production, by Hubert Phillips, who is also responsible for Value and Distribution; Public Finance, by the Rt. Hon. William Graham; Unemployment, by N. B. Dearle; A Survey of Industries and Business Management, both under the direction of the General Editor; and Statistics, by J. Cunlison, followed by a Statistical Appendix with tables and diagrams relating to the population of Great Britain.]

Poincaré (Raymond). *La Restauration Financière de la France*. 168 pp. Paris : Payot, 1928. Price 20 frs.

[A reprint, in book form, of M. Poincaré's speech, delivered to the French Chamber of Deputies on the 3rd and 4th February last. The speech described in detail the efforts made during the last two years to ease the financial situation, and their effects on the nation as a whole, and on the various classes considered separately. M. Poincaré then discussed the measures to be employed for the rehabilitation of the national finances and the monetary policy that would be most efficacious to that end. While in favour of stabilization, he was careful to point out that it involved many difficulties, and limited himself to saying that a return to convertibility to gold must come sooner or later, and the sooner the better. The speech contains many quotations from the last report of the Bank of France. The appendices include a number of statistical tables relating to the Public Debt, Government transactions with the Bank of France, rates of discount, and index-numbers of prices. There are two charts in colour.]

Todd (John A.). *The Cotton World : a survey of the world's cotton supplies and consumption*. Founded on lectures delivered at the City School of Commerce, Liverpool. Compiled and edited by John A. Todd, M.A., Principal of the School. 236 pp. London : Pitman, 1927. Price 5s.

[The work of summarizing and welding together the lectures on which the book is based has been so well performed that its origin might not be discovered if it had not been definitely stated, and the names of the particular lecturers appended to each chapter. The result is a coherent whole, and the book gives an orderly and very detailed account of an extremely complicated industry, beginning in Chapter I with the World's Cotton Supplies—including figures of crops and acreage over a number of years—and following the bales through the Liverpool Cotton Market (Chapter II) and the Lancashire Industry (Chapter III). The former describes the methods of dealing and of financing the trade, with a minute explanation of "spot sales," "futures" and all the intricacies of "hedging"; the latter the mechanical processes and finance of the manufacturing industry. Chapter IV is on World Consumption—Lancashire's Markets, Home Trade, South American, Indian and Eastern Trades; and the last chapter (V) deals with the organization of the Trade, agricultural departments, cotton associations, organizations of employers and employed, research, etc. As in previous works by the same author, the explanations are very clear and there is no waste of words. There are many statistical tables and diagrams, also a good index, and references are given at the end of each chapter to standard works on the branch of the subject dealt with.]

Virgìlii (Prof. Filippo). *Adamo Smith*. (I Maestri del Pensiero : No. 42.) Edizione Athena, Milano, 1928. Price Lire 5.

[In keeping with the plan of the pocket volumes of the series, the distinguished author of *Statistica*, 1891, and *Problema della Popolazione*, 1924, has given the Life and Works of Adam Smith in brief compass but with little left out, even as to the minor works, and with cordial appreciation, defending the Master stoutly against all and sundry critics, with rather too few than too many reservations.]

CURRENT NOTES.

Exports of British produce and manufactures were valued at £182 million in the first quarter of 1928, rather less than 7 per cent. above the corresponding exports in the first quarter of 1927. This rate of increase was not continued in the second quarter of the year, when the aggregate value of British exports, £173 million, was only a million pounds above the value of exports in the second quarter of 1927. The position was somewhat better with regard to articles wholly or mainly manufactured, the aggregate value of this group of exports being £147 million in the first quarter and £140 million in the second quarter of 1928, representing increases of 9.7 per cent. and 2.2 per cent. respectively over the value of exports of similarly described goods in the corresponding quarters of 1927. If the slight fall in average export prices be taken into account the comparison will be more in favour of 1928, so far as regards volume of trade, and if that part of the exports in the early months of 1927 which consisted of orders delayed from 1926 could be eliminated, the true position in 1928 would be seen to be better than is represented by the money figures. Exports of coal were stimulated in the first half of 1927 by the necessity of replenishing depots of British coal abroad which had been depleted during the coal stoppage. In the first half of 1928 coal exports were 6.6 per cent. less in tonnage than in the first half of 1927, but exports in the second quarter of 1928 were 4.4 per cent. greater than in the first quarter and only 1.7 per cent. less than in the second quarter of 1925. Exports of iron and steel and manufactures thereof were 9.3 per cent. greater in quantity in the first half of 1928 than in the first half of 1927 and 16.2 per cent. greater than in the first half of 1925. Exports in the second quarter of 1928 also showed a slight advance over those in the first quarter, but the increase which had shown itself in the second half of 1927 was not maintained in 1928, there being a not unimportant falling off in the exports of finished iron and steel goods. Sensible increases in the second quarter of 1928 compared with the first quarter were also shown in machinery, tools, cutlery, locomotives, and motor cars and cycles. Exports of cotton piece goods were 16.1 per cent. less in square yardage in the second

quarter than in the first quarter of 1928, the chief cause being a serious decline in exports to Bengal in the last three months on account of a refusal of the merchants to buy, apparently for economic reasons; exports to Bombay showed a large increase. Exports of woollen and worsted tissues were 6.1 per cent. greater in quantity in the second quarter of 1928 than in the corresponding period of 1927, but 21.5 per cent. less than in the first quarter of 1928; a reduction of nearly the same magnitude occurred in 1927, apparently for seasonal causes.

Retained imports of foodstuffs were mostly less in quantity in the second quarter of 1928 than they had been in the second quarter of 1927, notable decreases being 16.3 per cent. in wheat, 42.4 per cent. in maize, and 31.2 per cent. in chilled and frozen beef. On the other hand, there was an increase of 2,055,000 cwts. (29.5 per cent.) in the retained imports of raw sugar, partly offset by a reduction of 1,364,000 cwts. (42.5 per cent.) in the imports of refined sugar. Taking the first eleven months of the cotton year (which ends 31st July), retained imports of raw cotton in that part of the 1926-7 cotton season were 1,687 million lbs., and in the corresponding part of the 1927-8 season 1,126 million lbs. Deliveries to mills were, however, according to the reports of the Liverpool Cotton Association, 1,434 million lbs. in the earlier period and 1,406 million lbs. in the later. During the first nine months of the wool-importing season (beginning 1st October), retained imports of sheep's and lambs' wool were about 419 million lbs. in 1926-7 and about 448 million lbs. in 1927-8. Retained imports of other textile raw materials, except raw silk, were less in quantity in the first half of 1928 than in the first half of 1927. Among manufactured goods the most noteworthy feature has been the continued decline, quarter by quarter since the beginning of 1927, in the imports of iron and steel goods; the reduction has been 52.6 per cent., from 1,473,000 tons in the first quarter of 1927 to 698,000 tons in the second quarter of 1928, a figure only slightly greater than the average quarterly imports (678,000 tons) in 1925. Retained imports of woollen and worsted tissues were greater in the first half of 1928 than in the corresponding period of 1927 by 6 per cent. The chief feature of the re-export trade of the second quarter of 1928 was a large increase in exports of rubber.

The following table compares the overseas trade of the United Kingdom in the twelve months ended 30th June, 1928, with that in the previous twelve months. The earlier period included most of the coal stoppage, and the figures relating thereto are, accordingly, far from normal.

| Movements and Classes. | Twelve Months ended June 30, 1928. | Twelve Months ended June 30, 1927. | Increase (+) or De- crease (—) in later period. | | | |
|--|---------------------------------------|---------------------------------------|---|----------------------------|--------------------------|----------------------------|
| Imports, c.i.f.— | £'000. | £'000. | £'000. | | | |
| Food, drink, and tobacco | 541,438 | 528,253 | + 13,185 | | | |
| Raw materials and articles mainly un- manufactured | 342,940 | 392,058 | — 49,118 | | | |
| Articles wholly or mainly manufac- tured | 315,848 | 330,660 | — 14,812 | | | |
| Other articles | 7,135 | 4,999 | + 2,136 | | | |
| Total Imports ... | 1,207,361 | 1,255,970 | — 48,609 | | | |
| Exports, f.o.b.— | | | | | | |
| <i>United Kingdom Produce and Manufactures—</i> | | | | | | |
| Food, drink, and tobacco | 53,186 | 50,654 | + 2,532 | | | |
| Raw materials and articles mainly un- manufactured | 72,005 | 55,701 | + 16,304 | | | |
| Articles wholly or mainly manufac- tured | 579,519 | 534,922 | + 44,597 | | | |
| Other articles | 17,287 | 15,897 | + 1,390 | | | |
| <i>Imported Merchandise—</i> | | | | | | |
| Food, drink, and tobacco | 26,625 | 26,587 | + 38 | | | |
| Raw materials and articles mainly un- manufactured | 72,184 | 72,933 | — 749 | | | |
| Articles wholly or mainly manufac- tured | 25,329 | 25,441 | — 112 | | | |
| Other articles | 190 | 155 | + 35 | | | |
| Total Exports ... | 846,325 | 782,290 | + 64,035 | | | |
| Bullion and Specie— | | | | | | |
| Imports | 43,592 | 48,548 | — 4,956 | | | |
| Exports | 42,905 | 44,111 | — 1,206 | | | |
| Movements of Shipping in the Foreign Trade— | Number of Vessels. | Thou. and Net Tons. | Number of Vessels. | Thous. and Net Tons. | Number of Ve-sels. | Thous. and Net Tons. |
| <i>Entered with cargoes—</i> | | | | | | |
| British | 32,645 | 40,286 | 38,579 | 45,045 | — 5,934 | — 4,759 |
| Foreign | 26,298 | 19,975 | 27,822 | 22,068 | — 1,524 | — 2,093 |
| Total entered ... | 58,943 | 60,261 | 66,401 | 67,113 | — 7,458 | — 6,852 |
| <i>Cleared with cargoes—</i> | | | | | | |
| British | 37,902 | 42,644 | 31,158 | 36,664 | + 6,744 | + 5,980 |
| Foreign | 21,733 | 20,996 | 16,552 | 15,201 | + 5,181 | + 5,795 |
| Total cleared ... | 59,635 | 63,640 | 47,710 | 51,865 | + 11,925 | + 11,775 |

The Board of Trade have published their usual calculations as to changes in the prices of goods entering into our overseas trade. Comparing the twelve months ended 30th June, 1928 (as shown in the preceding table) with the calendar year 1924, it appears that there has been a fall of 11.2 per cent. in the average values of imports, of 14 per cent. in average values of British exports, and of 0.2 per cent. in average values of goods imported and re-exported. Applying these price-changes to the declared values of imports and exports it is estimated that our import trade increased in volume by 6.4 per cent. and our export trade by 4.8 per cent., while our re-export trade decreased by 11.1 per cent. As our overseas trade during the twelve months beginning with July, 1927, was seriously reduced as a consequence of the coal stoppage, which also introduced other abnormalities into our commerce, there does not appear to be any advantage in making similar calculations for that period.

Wholesale prices in this country as measured at the Board of Trade were, on the average, 0.5 per cent. higher in March than in February, the index-numbers for the two months being 84.7 and 84.3 respectively (1924 = 100). In both of the two main groups there were contrary movements; in the food group increases in cereals and in miscellaneous foods had to be set off against decreases in the prices of meat and fish, the net result being an increase of 0.3 per cent., while in the industrial materials group an average increase of 0.5 per cent. covered increases in textiles, particularly cotton, and in iron and steel, and decreases in metals and minerals other than iron and steel and in miscellaneous industrial materials. Wholesale prices during April showed a further increase, amounting to 1.8 per cent. over the level of March prices, so that the index-number for April rose to 86. All three classes of foodstuffs contributed to an average increase of 4.4 per cent. in that group; in the industrial materials group there were two exceptions to the upward movement, viz. iron and steel, and the miscellaneous class, and the average increase for the group as a whole was only 0.3 per cent. If the average for 1913 be taken as 100, the Board of Trade index-number for April recorded a level of 140.8, the figures for the 53 articles of food and for the 97 industrial materials upon which this index-number is based being 152 and 134.7 respectively.

Of the various groups upon which the total *Economist* index-number of wholesale prices is built up, primary foodstuffs and textiles were responsible for a further upward movement in that index-number during March which carried it from 178.2 at the end of February to 180.3 a month later. The upward tendency continued

in April, so that by the end of that month the index-number standing at 183·6 recorded the highest point reached since August of last year. In April increases in the various groups were fairly general, but the rise in the total was assisted by the sharp rise in petroleum as a result of the new import duty of 4*d.* per gallon imposed by the Budget. These changes raised the increase over the pre-war figure from 52·8 per cent. at the end of February to 57·4 per cent. at the end of April. The increase over the pre-war level remained most marked in the case of subsidiary foodstuffs (90 per cent.), while minerals and the miscellaneous group were only 30 and 36 per cent. respectively higher than in July, 1914.

In the case of the *Statist* index-number of wholesale prices, the increase during the month of March was 2·1 per cent., the figure on March 31 being 123·6. It is interesting to note that this figure is identical with that recorded a year before. During March each group, with the sole exception of the textiles group, contributed its quota to the upward movement shown in the aggregate index-number. The month of April witnessed a further increase of 1·6 per cent. in this number, carrying it to 125·6 on April 30. This advance was in part the reflection of seasonal factors affecting principally the vegetable food section, and was also partly attributable to the new import duty on oils. During the past year, as the *Statist* points out, the trend of prices in gold-standard countries was in an upward direction, and in comparison with these sterling prices were comparatively stable. At the end of April the increase over the 1913 level according to the *Statist* index-number was 47·8 per cent., as compared with 45·1 per cent. a year before. The corresponding increase measured by Bradstreet's index-number for U.S.A. was 45·9 per cent.

The increase in the general level of retail food prices in Great Britain and Northern Ireland over the July, 1914 level, as measured by the Ministry of Labour, stood at March 31 at 55 per cent., the same as a month before and a year before. At May 1 the average level showed a slight decline to 54 per cent. above the pre-war figure. Milk and butter showed seasonal decreases, and in a majority of cases sugar was reduced by ¼*d.* per lb. as the result of the change in taxation, but on the other hand potatoes and meat were dearer. Where the calculation is extended to cover, in addition to foodstuffs, the level of rent, clothing, fuel and light prices and certain other household and personal supplies, it indicates that at March 31 the average level of retail prices was 64 per cent. above the level of prices in July, 1914, and this same figure applied on May 1. The fact that expenditure on food accounted for 60 per cent. of the total pre-war

family budget upon which this index-number is constructed, enables one to calculate that the average increase in the prices included other than retail food prices was approximately 77 per cent. The principal items in this figure for May 1 were rent and rates (51 per cent.), clothing (120 per cent.) and fuel and light (70 per cent.).

The following table summarizes for the principal countries the latest information as to retail prices overseas as reproduced in the *Labour Gazette*. The third column gives the percentage increase in retail food prices on those ruling in July, 1914, or some similar pre-war period; the fourth column gives the estimated percentage increase for all the items covered by the budget in each case, such items, in addition to food, comprising generally rent, clothing, fuel and light, and other household requirements :—

| Country. | Date of latest return. | Food. | All items. |
|---------------------------------|------------------------|----------------------|----------------------|
| <i>Overseas Dominions, etc.</i> | | Percentage increase. | Percentage increase. |
| Australia | March, 1928 | 53 | 47 (1st qr.) |
| Canada | April, 1928 | 48 | 56 |
| India (Bombay)*... | April, 1928 | 40 | 44 |
| Irish Free State ... | January, 1928 ... | 75 | 77 |
| New Zealand | April, 1928 | 44 | 61 |
| South Africa | March, 1928 | 18 | 32 |
| <i>Foreign Countries.</i> | | | |
| Belgium | April, 1928 | — | 707 |
| Czechoslovakia (Prague) | March, 1928 | 802 | 630 |
| Denmark | April, 1928 | 52 | 76 |
| Egypt (Cairo) | January, 1928 ... | 43 | — |
| France (Paris) | April, 1928 | 432 | 407 (1st qr.) |
| France (other towns) | February, 1928 ... | 422 | — |
| Germany | April, 1928 | 51 | 51 |
| Holland (Amsterdam) | December, 1927 .. | — | 70 |
| Italy (Milan) | March, 1928 | 416 | 431 |
| Norway | April, 1928 | 71 | 93 |
| Spain (Madrid) | February, 1928 ... | 75 | — |
| Sweden | April, 1928 | 54 | 71 |
| Switzerland | March, 1928 | 57 | 60 |
| United States | March, 1928 | 49 | 72 (Dec. 1927) |

* Native families.

With reference to statistics relating to employment in Great Britain and Northern Ireland, quoted on p. 273 of Part II of the *Journal*, the *Labour Gazette* recorded a steady improvement of employment during March, but during April employment was subject to considerable fluctuation, particularly after the Easter holidays, and at the end of April it was not quite so good on the whole as at the end of March. Among the workpeople (aged 16 to 64 inclusive, and numbering approximately 11,800,000) insured against

unemployment under the Unemployment Insurance Acts in Great Britain and Northern Ireland, the percentage unemployed (including those temporarily stopped as well as those wholly unemployed) in all industries taken together was 9.6 on March 26, and remained at that figure on April 23, as compared with 9.4 on April 25, 1927. The total number of applicants for employment registered at Employment Exchanges in Great Britain and Northern Ireland on March 26 was approximately 1,063,000; on April 30 it was 1,171,000, as compared with 1,075,000 on April 25, 1927.

Official statements as to employment in Germany quoted from the *Reichsarbeitsblatt* by the *Labour Gazette* show that from the middle of January to the middle of March a slow but steady decline took place in the number of persons registered as unemployed at the Employment Exchanges, the total of which at the earlier date had exceeded two millions. In the first of these two months in spite of bad weather there was a reduction from 11.2 to 10.4 in the percentage of unemployed members of trade unions, and a decline of over 85,000 in the number of applicants for work at Employment Exchanges. At the end of March the Exchanges reported 1,664,440 persons on the "live register" as against 1,933,320 at the end of February and 1,919,518 at the end of March, 1927. The number of insured persons in receipt of benefit in respect of total unemployment on March 31 was 1,208,406, as against 1,452,416 a month before, and the percentage of unemployed among the members of trade unions with a total membership of over four millions was 9.2, as against 10.4 a month before and 11.5 a year before. In France the total number of unemployed persons remaining on the "live register" of the Exchanges on March 31 was 22,325, which by April 28 had fallen to 18,420. In the case of Norway the trade union percentage of unemployment fell from 22.3 at the end of January to 20.5 at the end of February, the latter figure comparing with 26.6 for the end of February, 1927. For Swedish trade union returns, returns are quoted by the *Labour Gazette* up to the end of March, when the percentage of unemployment was 13.1, as compared with 13.2 a month before and 14.1 a year before. In the third Scandinavian kingdom, returns supplied to the Danish Statistical Department by trade unions and by the Central Employment Exchange showed that 22.5 per cent. of the workers covered by the returns were unemployed at the end of March; this figure represented an improvement on that for a month before (25.9 per cent.), as also on that of a year before (26.2 per cent.). The Journal of the Dutch Statistical Office publishes figures showing that out of 311,549 members of subsidized unemployment funds making returns for the last week of March, 4.1 per cent. were unemployed during the whole week and

1.3 per cent. for less than six days. In the last week of February the percentages were respectively 6.1 and 1.9.

In Canada the index-number of employment is based upon returns received from nearly 6,200 firms, with an aggregate of approximately 843,000 on their pay rolls. If employment in the week ended January 17, 1920, be represented by 100, the index-number of employment for April 1, 1928, was 101.1, as compared with 101.4 at the beginning of the preceding month and 96.2 on April 1, 1927. On February 29, 1928, 7 per cent. of the aggregate membership of Canadian trade unions making returns were unemployed, as against 6.8 per cent. a month before and 6.5 per cent. a year before. The monthly report on employment issued by the Federal Department of Labour Statistics at Washington is now based upon returns received from 10,880 establishments in 54 of the principal manufacturing industries, and covers over three million workers. If the monthly average index-number of employment in manufacturing industries in 1923 be taken as 100, the corresponding figure for March, 1928 was 86.1, as compared with 85.5 for February and 91.4 for March, 1927.

The second part of Vol. VII of *Metron* conforms to the sound editorial policy of providing matter of interest to all classes of serious statisticians. The most interesting paper in the number from the theoretical point of view is that of S. Bernstein, who deals with this problem:—Two variables are so related that the mean of one, say y , is completely determined by the value of x , and the distribution of y for a given value of x , say $f_x(y)$, is independent of the value of x ; we may write it $\rho(y - f(x))$. A similar relation holds for the arrays of x . Required the most general form of the surface $F(x, y)$, of which a normal surface is a particular case. The author deals with the further generalization involved when $f_x(y)$ and $f_y(x)$ are displaced and compressed or dilated, so that $f_x(y)$ takes the form $f_1[\lambda(x)y - f(x)]\lambda(x)$. He deals with the particular case of $-\log F(x, y)$ being a polynomial, and finds that the polynomial cannot be of higher degree than the second in either variable.

W. T. Russell contributes a study of Irish fertility between 1870 and 1911, the results of which are hard to reconcile with the view that decline of fertility is a mere corollary to the widespread use of anti-conceptual methods. In 1880-2 there was a decided decrease of fertility, particularly in the province of Connaught, while the fertility of the counties of Antrim and Down (with a Roman Catholic population of at most 25 per cent.) has declined only 8 per cent. in forty years, as compared with 30 per cent. in rural Wales.

Biometrika for December, 1927 (Vol. XIX, Parts III and IV) contains a new series of tables by Dr. Alice Lee for tetrachoric correlations, in substitution of, and extending, Table XXIX in *Tables for Statisticians*. These are, for $\frac{d}{N}$, tables of triple argument, the tabulated independent variables being—

$$r = \cdot 00, \cdot 05, \cdot 10, \dots, \cdot 95$$

$$h = \cdot 0, \cdot 1, \cdot 2, \dots, 2\cdot 6$$

$$k = \cdot 0, \cdot 1, \cdot 2, \dots, 2\cdot 6.$$

An important paper by the Editor and Miss Moul criticizes Professor Spearman's use of correlations for establishing his psychological Eclectic Theory of Two Factors.

Other contributions include two papers on the distributions of mean of certain samples, with an editorial note on the theory of small samples, one by Dr. Stocks on Goitre in Adolescence, dealing, *e.g.*, with the effect of thyroid gland growth and iodine deprivation on stature, and one by Rabinowitch from Montreal on Insulin. Dr. Morant concludes with a survey of Australian and Tasmanian craniometry.

The seventh lecture delivered under the Henderson Trust, founded in 1892 for the furtherance of the aims and objects of phrenological science, was given at Edinburgh on November 4th, 1927, by Dr. Cyril Burt, on "the measurement of mental capacities, a review of the psychology of individual differences." His lecture has since been published (Oliver and Boyd, London and Edinburgh, 1927. price 6*d.*) in pamphlet form. The discussion turns first upon the mental characteristics which modern research recognizes—character and intellect, the one relatively independent of the other, inborn qualities and acquired attainments, specific qualities as opposed to those that are general. The methods of assessment, both ancient and modern, of these qualities of the mind are passed in review. Physical criteria upon which have been systematized the would-be sciences, physiognomy and phrenology, cheiromancy and graphology, are held to be suggestive but seldom convincing. Much statistical research will be needed before we can decide what degree of probability can be attached to the inferences drawn. We cannot, with Julius Cæsar, say too confidently "Your fat, sleek-headed men I never reckon of; they sleep o' nights. But these pale-visaged carrion, with the lean and hungry look, they think too much; such men are dangerous." And so we reach the sound and central maxim of individual psychology of to-day: Judge mental functions by mental symptoms, not by physical. This has given rise to the

various types of mental tests, the quantitative and qualitative estimates of mental age. The existence of general intelligence (Professor Spearman's "G"), as a working hypothesis at any rate, is now pretty widely accepted, and much of the attention of modern research workers has been turned to the measurement of special abilities—such as sense perception, motor capacity, manual factors, imagery and imagination, verbal or linguistic ability, and memory. Dr. Burt discusses all these and other special factors entering into intellectual processes, showing how far they run parallel to the tentative list of faculties adopted by the phrenologist of old. All the views that he sets forth, he admits, are still speculative. Yet, provisional and uncertain as they are, these newer methods of investigation and these latest hypothetical doctrines are already influencing every sphere of life. More research is therefore a paramount need.

We welcome a new edition of Professor Bowley's useful little book on *Official Statistics* (published by Mr. Humphrey Milford in his "World of To-day" series). The first issue, which was noticed in the *Journal* for 1921, p. 484, was rather unfortunately timed. It appeared when the latest census was over nine years old and other figures were greatly in arrear owing to the war; also just before the establishment of the Permanent Consultative Committee on Official Statistics (1921), the expansion of the Official Statistics of International Trade, the reconstruction of the Board of Trade Index-Number in the same year, and the resumption or development of various kinds of work after a period of abeyance for which the war was again responsible. Since, in his exposition, Professor Bowley refers specifically to the current issues of the various publications and the explanations are everywhere elucidated by concrete examples, a considerable part of the original book became obsolete soon after its publication, and the present edition has accordingly been largely rewritten, the references and figures being brought up to date (in the section on Migration, for instance, figures for 1926 replace those for 1909). Moreover, many of the author's criticisms were soon invalidated by events, and he has been able in the present edition to insert some notes on the recent Censuses of Production and Agriculture, the Ministry of Labour's Index-Number of Unemployment, and the Report of the Committee on Industry and Trade, in the place of remarks on the lack of recent data on these subjects. Altogether, the seventy-two pages of this little handbook afford very valuable guidance to those who desire to make use of the information contained in official returns. They will learn to what uses the statistics may properly be put, and how to avoid the pitfalls into which the unwary might slip without the signposts provided by Professor Bowley.

Attention may be drawn to a reprint from the Chinese *Economic Journal* of May, 1928, entitled "The Nankai Weekly Index-Number of Commodity Prices at Wholesale in China," which gives the summary results of a statistical investigation of wholesale commodity prices at Tientsin and Peking. It gives annual indices from 1913 onwards, monthly indices since the beginning of 1928, and weekly indices from April of this year. The rarity of statistical records was a great difficulty, and the investigation must have been abandoned entirely had not the wholesale dealers of the various industries come to the rescue by placing at the disposal of the Committee their old accounts to enable a search to be made for price quotations in years past. The accounts of at least two stores have been used for ascertainment of the price of each commodity, and "fair sampling" has been used as a substitute for "fair weighting," as there are no data for the latter process. Group indices are compiled for farm products, foods, cloth and clothing, metals and metal products, building materials, fuels and lights, and miscellaneous commodities. All indices are simple geometric averages, and 1926 has been taken as the base. The general index for all commodities has risen steadily from 66.88 in 1914 to 108.36 in the first week of April, 1928. The success of this enterprise of the Nankai University Committee on Social and Economic Research will be watched with interest.

The Society does not as a rule deal with economic history, though all statisticians recognize the importance of the study. Statistical record covers little more than about a century and a half, and of a good part of that period it would be true to say that it was more defective than reliable. Nevertheless, economic history enables us to see how the circumstances grew up in which early statistics emerged, to give them some measure of interpretation, and to understand the reasons for their defects. Contemporaneous history is, of course, indispensable for the understanding of current statistics and for the disclosure of the facts behind the figures, ignorance of which is only too apt to lead to faulty use of statistics in themselves accurate. We may, therefore, welcome here the recent publication of a memorial volume on the late George Unwin, sometime Professor of Economic History in the University of Manchester, published for the Royal Economic Society by Macmillan & Co. (*Studies in Economic History: the Collected Papers of George Unwin*, 1927, Pp. lxxiv + 490, price 15s. net).

A memoir by R. H. Tawney, prefixed to the volume, reveals a lovable and energetic character, full of enthusiasm for the exploration of a new field, and a careful lecturer, inspiring to students of the right sort. His first work, on *Industrial Organisation in the Sixteenth and Seventeenth Centuries*, appeared in 1904, and was followed by *The*

Gilds and Companies of London in 1908, *Finance and Trade under Edward III* in 1918, and *Samuel Oldknow and the Arkwrights* in 1924; but his many schemes for the publication of important books were constantly postponed by the claims of teaching and the allurements of research in many by-ways. The bulk of the present volume is devoted to a selection from his unpublished papers, together with certain of the chapters and articles contributed by him to books and periodicals. It covers topics as varied as the teaching of economic history, the mediæval city, the Merchant Adventurers' Company in the reign of Elizabeth, the history of the cloth industry in Suffolk, and the philosophy of value. All are of interest and will repay study.

The League of Nations Council has decided to summon an international conference, which will probably meet in Geneva on November 5th, to study the adoption of uniform methods of statistical compilation. The conference, which will be attended by official statisticians, will deal with (1) the scope of economic statistics, i.e. the field of economic activity which it is desirable that national statistics should normally cover, and (2) the methods to be applied by Governments in the compilation of industrial and commercial statistics in order to achieve comparability.

In his covering letter the Secretary-General of the League explains that it was considered desirable on the one hand to endeavour to reach an agreement with reference to the publication of certain categories of statistics, the best methods for the compilation of which have not yet been studied in detail, and on the other hand to submit certain principles with reference to method even for classes of statistics which it cannot yet be hoped that all Governments will be in a position immediately to compile. He urges that only by the adoption of such principles can the danger be avoided that the methods applied in those countries in which economic statistics are being most rapidly developed may become incomparable with one another.

The League's Economic Committee is now considering the desirability of drawing up a draft international agreement based on the information contained in the preparatory documents.

Volume II of the "Memorandum on International Trade and Balance of Payments, 1912-1926," has just been published by the League of Nations. In this volume the trade statistics of 64 countries for recent years are summarized. Notes are given explaining the manner in which the national trade statistics have in each case been compiled, and an introductory note summarizes the main differences in the meaning of the figures.

OBITUARY.

LORD EVERSLEY.

By the death of Lord Eversley on the 20th April last, at the age of 96, the Society loses its oldest ex-President. Lord Eversley was elected a Fellow of the Society, on the nomination of Sir Robert Giffen, in April 1877, and was elected President in the same year, filling the office for the two sessions 1877-8 and 1878-9. He had been Parliamentary Secretary of the Board of Trade from 1865 to 1871, and John Bright, who was President of the Board, being ill, the ministerial responsibility fell largely on Mr. Shaw-Lefevre, as he then was. No doubt it was his connection with the Board of Trade which aroused the interest in statistics which he retained for the rest of his life. To the continuance of that interest many can testify, for long after his retirement into private life he maintained a copious correspondence, and the present writer, among others, was a recipient of long communications on statistical and economic subjects. Belonging to the pre-dictation and pre-typewriter period, it was probably a grief to him when he ceased to be able to write in his own hand, as he did until a very few years ago.

Lord Eversley's two Presidential addresses, in 1877 and 1878, were general surveys of current economic and social questions rather than contributions to the discussion of specific subjects. In 1907 he read a paper on "The Decline in the Number of Agricultural Labourers in Great Britain." His interest in agriculture was stimulated by his chairmanship of the Royal Commission on Agriculture in 1893-5. Circumstances conspired to render his position difficult when the Commission came to consider its conclusions, but the ability and earnestness with which he conducted the enquiry and arranged the collection of information were generally recognized.

He held office in several Administrations, beginning with that of Lord Palmerston in 1866 and ending with that of Mr. Gladstone in 1892-4. His tenure of the Postmaster-Generalship was signalized by the introduction of the sixpenny telegram, and as President of the Local Government Board he was responsible for the Equalization of Rates (London) Act. As First Commissioner of Works, an office which he twice held, he achieved special distinction as an administrator.

The greatest achievement of Lord Eversley's life, and that by which he himself set most store, was the foundation in 1865 of the Commons Preservation Society and the work which, under his inspiration and guidance, was accomplished in protecting the rights of the public against the encroachments of lords of the manor. It may safely be said that no organization has done more important and enduring service to the community than this Society. As the result of its efforts thousands of acres have been secured for the use of the public for ever, which would otherwise long since have been appropriated to private use. The finest memorial to Lord Eversley, and that by which he would wish to be remembered, is to be found in Hampstead Heath, Epping Forest, Wimbledon Common, and many other open spaces saved for posterity by him and the modest Society which he started.

R. H. R.

STATISTICAL AND ECONOMIC ARTICLES IN RECENT PERIODICALS.

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Bankers' Magazine—

May, 1928—Instalment buying: *F. Morris*. The £ and the \$: *V. G. Worsfold*. Connection between the prices of commodities and the prices of securities: *E. G. Peake*.

June, 1928—Agricultural credits bill: *J. Brunton*. Influence of income tax on earnings: *J. C. Backhouse*.

Department of Lands and Agriculture Journal, Vol. 28, No. 2—Report on the department's wheat propagation scheme, 1925-26.

Economic Journal, June, 1928—The business prospect in the United States: *L. H. Sloan*. The Liberal Industrial Report: *H. Clay*. Taxation, risk-taking and the price level: *Sir J. C. Stamp*. Notes on index-numbers: *A. L. Bowley*. An analysis of supply: *A. C. Pigou*.

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May, 1928—The economic position of agriculture: *Sir Daniel Hall*.

Public Administration, April, 1928—Efficiency as an alternative to control: *Sir H. N. Bunbury* and *J. H. Rothwell*. Trade unions and efficiency: *G. H. Stuart-Bunning*, *F. H. C. Wiltshire*, *H. Corser*, *A. Ramsay*, and *A. Pugh*. The control of rates for public utility services in America: *A. J. Waldegrave*.

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UNITED KINGDOM—*Contd.*

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Royal Sanitary Institute, April, 1928—The influence of overcrowding upon tuberculosis, with special reference to the new housing schemes: *G. Hurrell*.

Secretary—

April, 1928—Company accounts and balance sheets: *R. Ashworth*.

May, 1928—Discussion on Mr. W. C. Dampier-Whetham's paper on "The agricultural depression: its causes and possible cures."

June, 1928—The currency notes: *W. H. Coates*.

INDIA—

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AUSTRALIA AND NEW ZEALAND—

Economic Record—

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May, 1928—Labour mobility in Australian industry: *F. R. E. Mauldon*. New Zealand infant mortality and still births: *M. Fraser*. Relative significance of primary and secondary production: *C. H. Wickens*. The economic position of the farmer in New Zealand: *H. Belshaw*. The law of diminishing returns in agricultural experiment.

UNITED STATES—

Actuarial Society of America, Transactions, October, 1927—Occupational mortality: *A. Hunter*. Graduation based on a modification of osculatory interpolation: *W. A. Jenkins*.

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June, 1928—Emergence of free labor contract in England: *H. M. Cassidy*. Measurement of time valuation: *J. G. Smith*. Progress of farm relief: *J. B. Black*.

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March, 1928—Use of cost-of-living figures in wage adjustments:

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E. Stewart. American trade unions and the problem of unemployment.

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Hefte 2, 1928—Om beregning af forædlingværdien : *A. Jensen.* Statsgælden, dens forrentning og amortisation : *J. Schaarup.*

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February, 1928—Des caractéristiques de notre temps sur l'idée de responsabilité civile : *J. Ricol.*

March, 1928—Les rapports actuels entre la science et l'action sociale : *G. Hostelot.*

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*March, 1928—*Le congrès mondial de la population : *J. Bourdon.* Valeur relative des capitaux fixes et des capitaux circulants : *Yves-Guyot.*

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Alcune questioni riguardanti le variabili casuali che seguono la legge normale: *P. Martinotti*. Rendite con termini variabili in progressione aritmetica di ordine superiore: *E. Lenzi*.

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June, 1928—An enquiry into working conditions in coal mines: *F. Marrette*. Rationalisation and unemployment: *H. Fuss*. The handicraftsman and modern industry: *H. Rabinowitch*. Recent wage changes in France and Belgium.

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LIST OF ADDITIONS TO THE LIBRARY.

Since the issue of Part II, 1928, the Society has received the publications enumerated below:—

I.—OFFICIAL PUBLICATIONS.

(a) United Kingdom and its several Divisions.

United Kingdom—

Imperial Economic Committee. Eighth report. Functions and work of the Committee. 22 pp. London: H.M. Stationery Office, 1928. 6d. (The Stationery Office.)

Industry and Trade, Committee on—

Survey of metal industries. Iron and steel, engineering, electrical manufacturing, shipbuilding, and the coal industry. viii + 528 pp. London: H.M. Stationery Office, 1928. 5s. (*Id.*)

Survey of textile industries. Cotton, wool, artificial silk. vi + 328 pp. London: H.M. Stationery Office, 1928. 3s. 6d. (*Id.*)

Further factors in industrial and commercial efficiency. Part II of a survey of industries. 361 pp. London: H.M. Stationery Office, 1928. 3s. 6d. (*Id.*)

Labour, Ministry of—

Report of the Ministry for the year 1927. 135 pp. London: H.M. Stationery Office, 1928. 2s. 6d. (*Id.*)

Report on an investigation into the personal circumstances and industrial history of 9,748 claimants to unemployment benefit. April, 1927. 98 pp. London: H.M. Stationery Office, 1928. 2s. 6d. (*Id.*)

National Insurance Audit Department, 1927, Fourteenth report. 28 pp. London: H.M. Stationery Office, 1928. 9d. (*Id.*)

Official Statistics, Permanent Consultative Committee on. Guide to current official statistics, Vol. 6, 1927. 288 pp. London: H.M. Stationery Office, 1928. 1s. (The Committee.)

Overseas Trade, Department of—

Reports on financial and economic conditions, etc., as follows: Belgium (1927), with an annex on the economic situation in the Grand Duchy of Luxemburg, 4s.; Chile (Nov., 1927), 3s. 6d.; Republic of Honduras during financial year ended July, 1927; Hungary (1926-27), 1s. 6d.; Italy (April, 1928), 3s. 6d.; Lithuania (March, 1928), 9d.; Netherlands (1927), 3s.; Nicaragua, 6d.; Persia (1925-27), 1s.; Poland (1927), 1s. 6d.; Sweden (1927), 1s. London: H.M. Stationery Office, 1928. (The Department.)

Trade, Board of. Third Census of Production, 1924. Preliminary Reports. No. 31. General survey of Government departments. Admiralty, War Office, Ordnance Survey Department of Great Britain, Stationery Office. Lighthouse Authorities, G.P.O. Office of Works, Prison Commission, xii pp. fol. London, March, 1928. 6d. (The Board.)

Treasury. Account of revenue and expenditure of the Isle of Man. 6 pp. London: H.M. Stationery Office, 1927. 4d. (The Treasury.)

England and Wales—*Health, Ministry of.* Public health and medical subjects—

No. 50. An investigation of lymphadenoma with relapsing pyrexia. vi + 86 pp. 1928. 1s. 6d. No. 52. A report on chronic arthritis with special reference to provision of treatment. x + 103 pp. 1928. 1s. 6d. (The Ministry.)

(b) United Kingdom—*Contd.***England and Wales—*Contd.****Industrial Fatigue Research Board—*

Reports. No. 45. Two contributions to the experimental study of the menstrual cycle. iv + 73 pp. 1928. 2s. 6d. (The Board.) No. 49. On the relief of eye-strain among persons performing very fine work. iv + 30 pp. 1928. 1s. 3d. (*Id.*) No. 50. The physiological cost of the muscular movements involved in barrow work. v + 23 pp. 1928. 1s. (H.M. Stationery Office.)

Eighth Annual Report of the Board. 36 pp. 1928. 9d. (The Board.)

London County Council. Census, 1921. Report on statistics relating to Greater London contained in the various volumes of the census of England and Wales. xxvii + 34 pp. 1928. (London County Council.)

Northern Ireland—

Census, 1926. Counties of Antrim, xxii + 75 fol. pp.; Armagh, xxii + 50 fol. pp.; Down, xxii + 71 fol. pp.; Fermanagh, xxi + 64 fol. pp.; Belfast, 1928. 5s. each. (The Registrar-General.)

(b) India, Dominions and Protectorates.

India—

Bengal Government. Irrigation Department. Report on rainfall and floods in North Bengal, 1870–1922. P. C. Mahalanobis. 90 fol. pp. Calcutta, 1927. 30s. (Bengal Government.)

Meteorological Department. Sky-illumination at sunrise and sunset. K. R. Ramanathan. 13 pp. Calcutta, 1927. 1s. (The Department.)

Irish Free State—

Banking Commission. Final reports of the commission. 65 pp. Dublin, 1927. 1s. (The Commission.)

First interim report on banking and currency. 78 pp. Dublin, 1927. 1s. (*Id.*)

Fiscal Inquiry Committee. Reports of the Committee. 76 pp. Dublin, 1923–4. 1s. 6d. (The Committee.)

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Statistics of workmen's compensation, 1926. 15 pp. Dublin, 1928. 2d. (*Id.*)

Report of the tribunal on prices. 248 pp. Dublin, 1927. (*Id.*)

Intoxicating Liquor Commission. Report of the Commission, 1925. 33 pp. Dublin, 1928. 2d. (The Commission.)

Technical Education Commission. Report of the Commission. x + 210 pp. Dublin, 1927. 2s. 3d. (The Commission.)

East Africa—

Zanzibar Protectorate, Statistics, 1893–1927. 24 pp. Zanzibar, 1928. (Chief Secretary, Zanzibar.)

Union of South Africa.—

Fourth Census. May, 1926. Part III. Marital conditions (Europeans). vii + 55 pp. Pretoria, 1927. 5s. (Office of Census.)

Part IX. Dwellings. xv + 49 pp. Pretoria, 1928. (*Id.*)

(c) Foreign Countries.

Egypt—

Statistique des sociétés anonymes par actions, travaillant principalement en Egypte. Au 31 Dec. 1925. xiv + 389 fol. pp. Cairo, 1928. P.T. 30. (Ministère des Finances.)

Esthonia—

Agriculture en Estonie. 112 fol. pp. Tallinn, 1928. (Bureau Central de Statistique.)

(c) Foreign Countries—*Contd.***France—**

- Conseil supérieur du travail. 29th session. Nov. 1925. xix + 251 pp. Paris, 1926. (Ministère du Travail.)
30th session. Nov. 1926. xix + 145 pp. Paris, 1927. (*Id.*)

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- Volks-Berufs- und Betriebszählung vom Juni 1925. Berufszählung. Die berufliche und soziale Gliederung der Bevölkerung des Deutschen Reichs. Teil I. Einführung in die Berufszählung 1925. Teil II. Die Reichsbevölkerung nach Haupt- und Nebenberuf. 420 pp. Berlin, 1928. 13 Reichsmark. (German Statistical Office.)

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United States—*Agriculture, Department of—*

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Farmers' Bulletins. No. 1545. Dry farming. Methods and practices in wheat growing in the Columbia and Snake river basins. 22 pp. 1927. 10 cents. (*Id.*) No. 1546. Systems of live-stock farming in the black prairie belt of Alabama and Mississippi. 34 pp. 1927. 10 cents. (*Id.*) No. 1551. Marketing farm produce by parcel post. 54 pp. 1928. 10 cents. (*Id.*) No. 1553. Planning and recording family expenditures. 22 pp. 1927. 5 cents. (*Id.*) No. 1562. Farm practices under corn-borer conditions. 20 pp. 1928. (*Id.*)

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(d) International.

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Consultative Committee. Application of the recommendations of the International Economic Conference. 43 pp. 1928. 1s. 6d. (The League.)

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Report to the Council on the work of the 24th session. 4 fol. pp. 1928. (*Id.*)

Final text of amendments to the statutes of the Bulgarian National Bank. 9 fol. pp. 1928. (*Id.*)

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(d) *International—Contd.***League of Nations—Contd.****Economic and Financial Section—Contd.**

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THE COST OF LIVING OF A SAMPLE OF MIDDLE-CLASS FAMILIES.

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[Read before the Royal Statistical Society, May 15, 1928,
MR. C. P. SANGER, Vice-President, in the Chair.]

IN the autumn of 1925 I had the good fortune to be invited unofficially to draw up a form of enquiry with the object of determining the cost of living of a large body of middle-class families. I accepted the invitation with alacrity on the understanding that I might make use later of the data obtained. This permission was given, and I undertook that if the information was published it should appear in a form which would not disclose the figures supplied by particular individuals. I think I am free to state, however, that the material relates to families which are homogeneous in one very important respect: all the heads belong to the same profession, and the nature of their daily work is such that the keeping of accounts to them is as child's play. In view of this it might be thought that the response to the enquiry, when something like 2,500 forms were distributed, would be liberal, but this was not so. Experience has indeed proved that the ordinary individual has either to be cajoled or dragooned into the performance of any labour, however light, if it does not appear to him that he is likely to derive from it a direct benefit. In a Report published by the International Labour Office¹ it is stated that the Government of Australia initiated a budget enquiry in 1913. It was given wide publicity and 7,000 books were distributed from the Statistical Bureau. The number returned was only 417, or less than 6 per cent. of that total, and 25 of them were unsatisfactory. A similar enquiry was conducted in Western Australia, and we are told that "notwithstanding the efforts of the

agent, who spent a month in touring the State to stimulate interest, the response was utterly disappointing," the number of satisfactory returns received being only 66. A New Zealand enquiry elicited replies from 69 families out of 1,800. In the last British official enquiry, that of 1918, 10,000 forms were distributed and 1,306 satisfactory returns were received. In the light of these figures it is perhaps less surprising that a group of salaried workers, whose experience of the intrusion of the outsider into their private affairs is more limited than that of the working man, should be slow to meet advances which they are inclined to regard as inquisitorial.

The actual number of forms returned in the present investigation was 254, just over 10 per cent. of the number distributed; of this total, 5 related to families in Scotland, and 14 came from single persons, or were deemed unsatisfactory either because the information was inadequate or obviously incorrect. The remaining returns, relating to married men only, were examined in detail, and they form the main subject of the discussion which follows. From the figures quoted it appears that the proportion they represent of the number distributed to married men is much higher than is usual in such enquiries.

A copy of the forms circulated is shown on pp. 501-2, with only certain headings and words altered or omitted to preserve their confidential character. Each form was divided into two parts, printed on separate sheets of paper. The purpose of Part I was to discover the total expenditure of each family in the course of a year, analyzed under several heads. Incidentally, in this part, questions were asked as to marital condition, number of dependents, salary, etc. Some of this information was essential to the purpose of the present enquiry, while some of it, *e.g.* that relating to salary, was of value only as an indirect check on answers to other questions. Recognizing that the practice of keeping exact accounts is not a common one, two columns were provided for the figures of annual expenditure, so that an estimate might be given where exactness was impossible. A glance at the different items of expenditure will at once suggest that exact figures are more likely to be available in regard to some items, such as house rent, than to others, such as clothing, and this was borne out by the replies received. The purpose of Part 2 was to obtain, if possible, a more detailed record of the expenditure on food, by asking for a return of the actual money spent and quantities purchased during four specified weeks. Here the response was naturally less satisfactory than that secured to the Part 1 queries, because it involved some trouble to those housewives who were unaccustomed to keeping careful accounts. The total number of replies received, after leaving out as before those which

constituted only a small and unrepresentative group or were otherwise unsatisfactory, was 186. This part of the form was almost a duplicate of that issued in the Government enquiry of 1918, as it was thought that comparable results might be of some interest. A letter was sent out with each form explaining its purpose and emphasizing in particular three points in the following words:—

1. If all the details cannot be furnished, kindly give as much information as you can, *provided it is reasonably accurate.*
2. Any estimate should be as near the mark of normal expenditure as possible. The purpose of the investigation will be altogether nullified if members intentionally exaggerate any entries in order to make expenditure appear large relative to income.
3. *No individual is asked to disclose his identity.*

I sent the forms as originally planned for criticism to Professor A. L. Bowley, who has had a wide experience of cost of living enquiries. He very kindly looked over them and suggested one or two slight amendments and additions. After that they had to pass a general committee, certain members of which desired to cut out some questions altogether and to make alterations here and there. The net result was that a few changes—not, I think, improvements—were made, but the forms were not substantially altered.

Analysis of Part 1 Returns.—It will be observed that the first question in Part 1 is a geographical one. It enables us to separate out the returns to be discussed into three groups, according as the families concerned were located in London, in (A) towns with a population exceeding 50,000, or in (B) towns with a population less than 50,000. These three groups were treated independently, but all on precisely the same lines. They thus provide a valuable check on one another, and, moreover, the comparison of results is in itself interesting.

The numbers of satisfactory returns in the three groups were: L, 50; A, 62; B, 123. If the general method of analysis followed is first described in detail, it will then only be necessary to give the results for the three groups. The forms were first tabulated in order of total expenditure. Expenditure was chosen rather than income, because it is by what a person spends, and not by what he saves, that his standard of life is determined.* Further, the neces-

* Where the income is so modest that most of it has to be spent upon the requisites of life, as is true for a large proportion of the working-class population, it would matter little whether one grouped returns according to expenditure or according to income, granted that one could get adequate data in regard to each.

sary data would not have been available for an analysis according to income, seeing that the information asked for on the forms related only to salary, and in many of these families there were other sources of income, such as investments, the generosity of relatives, or the earnings of partial dependents. It may be asked why then the question as to salary was inserted at all, and the reply is, that the forms were designed to serve another purpose besides that for which they are now used.

The extreme limits of estimated expenditure in each group were wide apart, and to have combined families with such different standards of living would have resulted in averages with little or no meaning. Again, while I was satisfied that in all the returns under discussion an honest attempt had been made to answer the questions properly, yet it had to be remembered that many persons were only able to give estimates of their annual expenditure under some heads. Such estimates, owing to the fallibility of human judgment, are liable to error, and, although the majority may be expected to be not very far from the true mark, a few will certainly be unduly high and a few unduly low. As one could not be sure that the wilder shots at either end would cancel one another out, I decided to avoid giving them any weight one way or the other. This was achieved by arranging the forms in order of total expenditure from lowest to highest and selecting the middle one as most likely to be representative of the true expenditure of, at all events, its neighbours in the group. The median, in short, was adopted as an average in place of the arithmetic mean, in that the latter, unlike the former, would have been greatly affected by the unassessable consequences of errors of judgment lurking in the raw material. But, in addition, I decided to pick out the "quintiles" * of expenditure, and that for two reasons. There is less likelihood of any casual reader concluding that the median is closely representative of the whole group: the median in this case represents only what is more or less typical for families near the middle of the group. The quintiles of total expenditure show us, in addition, what is typical of the standard of living among families in the lower and upper regions of the group. My second reason was that I was anxious to allow in some way for the variation in size of family. The question of how this should be done is a difficult one. Allowance can be made, and has been made in many previous investigations, for differences in food consumption as between man, woman, and child. It may be refined, taking into account the variation with age and sex of children as they grow to maturity, or it may be only rough. This

* In an ordered series of 100 observations the four quintiles would be the twentieth and fortieth observations from each end.

once settled, families of all sizes could be then reduced to a common unit. But, even assuming that a satisfactory gauge of food consumption had been determined on these lines appropriate to each age and sex, it would not be reasonable to apply the same proportions in estimating the "consumption" under education, or clothing, or house accommodation, or any other of the heads of expenditure we may wish to discuss. It would indeed be a difficult matter to decide with any precision, for example, exactly how much fuel and light should be allotted to one child when all the family share in the consumption, and there are similar difficulties to face with other commodities. It has been proposed to adopt a separate scale for each, but that would introduce too much complication to secure any agreement by authorities in its construction. That authorities are far from agreement at present upon a standard scale is plain from a glance at the following table:—

TABLE I.

The Consumption of Two Families expressed in terms of the Consumption of an Adult Male according to various Scales.²

| Scales. | | | | | 1st Family (units). | 2nd Family (units). |
|---------------|---|---------------|-----|-----|------------------------|------------------------|
| Based on Food | { | Quetelet | ... | ... | 3.83 | 3.46 |
| | | Atwater | ... | ... | 3.80 | 3.30 |
| | | Lusk | ... | ... | 4.49 | 3.86 |
| | | Amsterdam | ... | ... | 4.50 | 3.80 |
| | | United States | ... | ... | 4.70 | 3.95 |
| All Groups | { | German | ... | ... | 3.40 | 2.70 |
| | | Australian | ... | ... | 3.95 | 3.30 |

Both families are taken to consist of husband, wife, and three children. In the first, there are a boy of 15 years, a girl of 13, and a child of 11. In the second, there are a boy of 12 years, and two other children of 9 and 5 respectively.

In the analysis of budgets in general, this difficulty of standardization has hitherto resulted in the family being most frequently treated as a unit, independently of the persons it contains, but in discussing food consumption some attempt has not infrequently been made to allow for variation in the size of the unit. While I, too, have adopted this course and have allowed for variation in the constitution of the family in discussing Part 2 of the returns, the method I have used in the analysis of Part 1 has permitted some allowance to be made even there, if only roughly and indirectly, for such variation. The process of arranging the returns in order of their total expenditure has incidentally the effect of separating them out also more or less

in the order of the size of family, for, the larger the family, the higher does the expenditure tend to be. I tested this roughly by dividing up the returns in each of the three groups, L, A, and B (after arranging them in order according to total expenditure) into five sub-groups of approximately equal size, and calculating the arithmetic mean size of family for these quintile sub-groups, with the following result :—

TABLE II.

Distribution of Families according to Total Expenditure and according to Size of Family.

| Locality. | Arithmetic Mean Size of Family. | | | | |
|----------------|---------------------------------|----------------|-----|----------------|----------------|
| | Q ₁ | Q ₂ | Med | Q ₃ | Q ₄ |
| London | 2.1 | 2.6 | 2.5 | 3.8 | 3.8 |
| A Towns | 2.1 | 2.6 | 3.4 | 3.9 | 4.5 |
| B Towns | 2.3 | 2.8 | 3.2 | 3.8 | 4.2 |

In the above table the sub-groups, Q₁ to Q₄, are in ascending order of total expenditure. Thus, in the L row there are in all 50 families represented, 10 in each quintile sub-group; the 10 with the lowest total expenditure are assembled under Q₁ and are found to have an average of 2.1 "men" per family; similarly, the 10 with the greatest total expenditure are assembled under Q₄, and they have an average of 3.8 "men" per family. In the A row there are 12 families represented in each sub-group, except the central one, to which 14 families are allocated. Similarly, each sub-group in the B row represents 25 families, except the central one, to which 23 families are allocated. It should be added that "size of family" is reckoned here in terms of the unit "man," differentiation being made between men, women, and children on the basis of food consumption employed in the analysis of the Part 2 returns. Also, servants and other dependents are included under the heading of "Family." Perhaps "Household" would have been a better term to use throughout.

The inference to be drawn from the above table is that there is definite correlation between total expenditure and size of family, so that a method which sorts families out according to the first factor will, by the same token, sort them out roughly according to the second factor also.

We may therefore, I think, look upon the median and quintiles of total expenditure as giving us some idea of the variation in the standard of consumption within the group of middle-class families under discussion. The families are homogeneous in the sense that

the husbands and fathers have an outlook upon life common to members of the same profession, but they vary in size and in the amount they spend, and the median and the quintiles typify smaller and more homogeneous groups within the larger one in these further respects. The whole set of families is also divided into three large groups, which I have labelled L, A, and B, according to the type of locality in which they reside; and conditions may vary from one group to another, both as to habits of expenditure and as to the prices of things purchased. We know, for instance, that rents are higher in London than in most other towns. Such differences in price incidentally react upon habits and vice versa. It will not be anticipated, therefore, quite apart from normal fluctuations and possibilities of error which either have escaped notice or which cannot be corrected, that when the L, A, and B returns are treated quite independently the resulting quintiles will be in close agreement, but, if they do not differ greatly, that will be a fair indication that the method followed is not unsatisfactory. With this introduction the results of the first step in the main analysis may now be presented.

TABLE III.

Variation in Expenditure according to Type of Locality.

| Type. | No. of Returns. | Total Expenditure in £'s per annum. | | | | |
|----------------|-----------------|-------------------------------------|------------------|------|------------------|------------------|
| | | Q ₁ . | Q ₂ . | Med. | Q ₃ . | Q ₄ . |
| London | 50 | 366 | 443 | 468 | 501 | 596 |
| A Towns | 62 | 347 | 409 | 460 | 491 | 577 |
| B Towns | 123 | 355 | 417 | 454 | 507 | 678 |

Two things are remarkable in this table: (1) the closeness of agreement of the medians and of the corresponding quintiles with one exception; and (2) the order in which the types appear. I do not think that one would have expected expenditure in the smaller towns to exceed that in the larger towns as it appears here to do, and we shall look for fuller light on this difference later. It may be stated at once that it is apparently not due to families in the B towns being of a consistently greater average size than families in the A towns, for some of the figures in Table II point in anything in the opposite direction.

The London figures are everywhere higher than the A and B figures but for the two top quintiles, where the B figures exceed even those of London. The excess may not be significant for the third quintile, but it is marked for the fourth quintile.

Let us now proceed to consider the expenditure in more detail.

It might be thought to suffice if we dissected the quintiles and median of total expenditure already obtained in order to see how they are made up. But this method would not be altogether satisfactory, because, while the median, for instance, may itself be fairly representative of the normal total expenditure of the middle families of a group, some of its constituent elements may not be so; the expenditure on one commodity may be above the average and on another it may be below, a balance being effected between these two possibilities so as to result in a normal total expenditure.

A more thorough and satisfactory method, if we wish to obtain a picture of the amount of diversity in the expenditure on any one commodity or group of commodities, is to treat it independently exactly as we have treated the total expenditure. All the returns in the group under consideration, L, A, or B, must be arranged now in the order of their expenditure on this one commodity, or group of commodities, from the least expenditure to the greatest, and the quintiles and median can then be picked out as before. This method is likely to give results more truly representative of the desired normal expenditure than the other and it was therefore the method adopted, though it is to be understood throughout that, by adding together what is spent on different commodities determined in this way, we get aggregates spent by hypothetical and not actual families.

Some of the items listed separately in Part 1 of the forms are combined in the subsequent analysis. Thus, Rent, Rates and Taxes, and Water Rate are taken together. Income Tax does not appear in the list of expenses, because it is customary for the salary to be paid, in effect, after the deduction of income tax in the profession which is under review. Housekeeping, Wages, and Meals from Home are formed into one group under the title Housekeeping and Service. Holidays, Motoring, Clubs and Recreation, are formed into another group. Other Travelling Expenses are combined with expenditure on Travelling to Work. Also there is a Miscellaneous group in which Repairs and Renewals are included. All the other items are left separate as in the printed form.

On one or two items in the list the expenditure of some families was returned as nil. For instance, in a family of total abstainers from alcohol and tobacco nothing would appear under that head. The question arose whether or not such families should be included in the determination of the quintiles and median. Since they represent a definite type, I decided that the final results would not be truly representative of the group experience if they were omitted. It was also desirable to treat all commodities on the same basis. The effect of their inclusion is only very marked in one case, namely, in the expenditure on education. Owing to the fact that a large

TABLE IV.

Distribution of Expenditure, the Quintiles and Median, in different Types of Locality.

[No. of Returns :—London (L) = 50; Large Towns (A) = 62;
Small Towns (B) = 123.]

| Expenditure on | Amount spent in £s. per annum. | | | | |
|-----------------------------|--------------------------------|------------------|------|------------------|------------------|
| | Q ₁ . | Q ₂ . | Med. | Q ₃ . | Q ₄ . |
| Rent and Rates ... { L | 65 | 79 | 82 | 85 | 100 |
| ... { A | 48 | 55 | 60 | 66 | 79 |
| ... { B | 43 | 55 | 60 | 66 | 80 |
| Fuel and Light ... { L | 14 | 16 | 18 | 20 | 25 |
| ... { A | 14 | 17 | 19 | 21 | 24 |
| ... { B | 16 | 20 | 22 | 25 | 30 |
| Housekeeping and Ser- { L | 135 | 172 | 186 | 195 | 240 |
| vice ... { A | 126 | 166 | 180 | 206 | 249 |
| ... { B | 135 | 175 | 186 | 195 | 250 |
| Clothing ... { L | 25 | 40 | 41½ | 50 | 60 |
| ... { A | 30 | 36 | 48 | 52 | 72 |
| ... { B | 30 | 40 | 50 | 50 | 70 |
| Education ... { L | — | — | — | 12 | 37½ |
| ... { A | — | — | — | 2½ | 24 |
| ... { B | — | — | — | — | 30 |
| Doctor, Dentist, and { L | 3 | 5 | 7 | 10 | 20 |
| Chemist ... { A | 5 | 7 | 10 | 15 | 25 |
| ... { B | 5 | 6 | 10 | 10 | 18 |
| Insurance ... { L | 12 | 19 | 23 | 27 | 32 |
| ... { A | 13 | 24 | 25½ | 31 | 38 |
| ... { B | 13 | 20 | 25 | 30 | 40 |
| Holidays, Clubs, and { L | 25 | 33½ | 39½ | 43 | 61 |
| Recreation ... { A | 22 | 29 | 35 | 40 | 50 |
| ... { B | 28 | 38 | 46½ | 55 | 71 |
| Subscriptions and { L | 2 | 3 | 4½ | 5 | 15 |
| Charities ... { A | 2 | 3 | 5 | 6 | 10 |
| ... { B | 2 | 5 | 6 | 9 | 15 |
| Alcohol and Tobacco ... { L | 3 | 6½ | 7½ | 10 | 15 |
| ... { A | 5 | 8 | 10 | 12 | 20 |
| ... { B | 6 | 10 | 13 | 15 | 20 |
| Papers and Stamps ... { L | 3 | 3 | 4 | 5 | 6 |
| ... { A | 2 | 3 | 4 | 5 | 6 |
| ... { B | 3 | 4 | 5 | 5 | 6 |
| Travelling Expenses ... { L | 11 | 15½ | 17 | 19 | 23 |
| ... { A | 4 | 7 | 8½ | 10 | 14 |
| ... { B | — | 2 | 4 | 5 | 8 |
| Repairs, Renewals, and { L | 9 | 12½ | 15 | 21 | 37 |
| Sundries ... { A | 7 | 10 | 15 | 20 | 26 |
| ... { B | 5 | 10 | 15 | 18 | 30 |
| Total ... { L | 307 | 405 | 445 | 502 | 671½ |
| ... { A | 278 | 365 | 420 | 486½ | 637 |
| ... { B | 286 | 385 | 442½ | 483 | 668 |

proportion of families either contained no children or none of school age, the two lower quintiles and median expenditure under this head is nil for all three groups L, A, and B, and the third quintile expenditure for the B group is also zero.

The result of the analysis is summarized in Tables IV and V. The amount of the annual expenditure is given in Table IV under each head, while in Table V it is expressed as a percentage of the total expenditure obtained by adding up all these relative individual amounts. Bearing in mind that the quintiles and median may be regarded as defining the expenditure of fairly homogeneous groups of hypothetical families within the larger groups, L, A, or B, as we advance from left to right along the columns Q_1 to Q_4 we are able, by looking at the absolute figures in Table IV, to measure the diversity of expenditure under each head or the corresponding rise in the standard of living from one small group to the next. By looking at the percentage figures in Table V we are able to compare the relative expenditure of each large group on the several items which go to make up the totals. Considering that we have here figures for three groups, L, A, and B, which have been recorded and analyzed in absolute independence one of another, the results almost throughout are surprisingly consistent, and for such differences as appear some explanation may in general be offered, although it is important to remember that where they are relatively small they may not be significant. Let us first consider the absolute amounts spent on successive items in order.

Rent and Rates.—It is the common opinion that average rentals in London are distinctly higher than they are in the provinces. This is borne out by the figures of expenditure in Table IV. While A and B stand practically on a level at each of the quintile and the median points, London comes out very definitely at the top. It is odd that there should be so little difference between the A and B towns. A further analysis of the actual figures gave the following distributions when expressed as percentages of the whole number in each group :—

TABLE IVA.

Percentage Distribution of Rentals, inclusive of Rates and Taxes.

| Rentals. | L. | A. | B. |
|--------------------------|----|----|----|
| Under £30 | 2 | 0 | 2 |
| £30 and under £50 | 2 | 24 | 28 |
| £50 " £70 | 22 | 47 | 34 |
| £70 " £90 | 42 | 21 | 26 |
| £90 " £110 | 22 | 6 | 8 |
| Over £110 | 10 | 2 | 2 |

The arithmetic mean rentals, calculated from distributions grouped on the above lines, were, to the nearest pound, £82, £63, and £63, respectively, which are in satisfactory agreement with the median rentals, £82, £60, and £60 in Table IV.

Fuel and Light.—Here there is little to choose between the figures for London and the large towns (A); but the level of expenditure is appreciably higher in the smaller towns. It may be that gas and electricity can be supplied at a cheaper rate per unit in large towns where the demand for it is great, and also for that reason possibly subject to less fluctuation than in the small towns. In coal the cost of transport is an important element which favours the large town, and coal is a raw material also in the production of gas. There may be more competition too among merchants in the sale of coal and a finer cutting of prices in consequence in the large towns. These reasons would suffice to account for the difference between the A and B figures in the table.

In *Clothing* the expenditure is generally least in London (where the families are also smallest), but there is not a great deal to choose between the A and B towns. It is well known that many people avail themselves of cheap travelling facilities to go to the nearest large centre to buy their more important clothing; this would tend to equalize the figures in A and B. On the other hand, no small place is without at least one fairly good shop or store capable of supplying the ordinary household requirements. Their prices will be governed partly by their costs, partly by prices in large towns, and partly by what they can charge without inviting competition or driving their customers to seek some other method of satisfying their needs.* At least, expenditure on *Housekeeping and Service* in the B towns is not in general any lower than in London and the A towns. The size of the family is an important consideration also in housekeeping, and, if allowance could be made for that in comparing the three groups, it is to be noted that the London figures would be slightly raised relative to the A and B figures shown in Table IV, but the effect would not be consistently to draw the A and B figures nearer to each other. No safe general conclusion can be drawn from the statistics of expenditure on *Education*, because the returns are so few and the experience they represent is so varied. The proportion of families in the London group in which there were apparently no children of school age was 56 per cent., while in each

* Some figures are submitted later which bear upon prices in large and small towns. They only came to hand after I had completed the analysis and discussion of the budgets, but they do not appear to call for serious alteration in any of my earlier comments, though I have expanded two paragraphs and transferred them to the end of the paper.

of the A and B groups it was 60 per cent. *Doctor, Dentist, and Chemist*.—Since it is our usual practice only to seek medical advice when we have fallen ill, this expenditure is less normal in its incidence than the other types we have so far considered, but even here the figures are regular in their order. The London figures are generally the lowest, again partly perhaps because the choice of doctors, dentists, and chemists there is practically unlimited; but the average size of families is no doubt an important factor in this case and possibly in the expenditure on *Insurance*, for in both the order in which the groups occur is something the same for size of family and for expenditure. Under *Holidays, Clubs, and Recreation* the cost of upkeep and licence for a motor car or cycle is included, and this helps to place the small towns and country places, where car is more often regarded as almost indispensable, at the head of the list*; London, where clubs and recreation generally are expensive, comes next. There is greater variability in the expenditure on this group of "commodities," but it is reasonably consistent throughout. The money expended in *Subscriptions and on Charities*, nowhere large, is greatest in the smaller places where the victim is most easily caught. The expenditure on *Alcohol and Tobacco* is quite definitely least in London and greatest in the smaller places. For this I have no adequate explanation to offer, unless it be that the abler members of the profession certainly tend to gravitate to the large towns, and pre-eminently to London; and they probably possess among other qualities a greater measure of self-discipline even in such matters as the regulation of smoking and drinking, for the degree to which one succumbs to any habit is largely a question of will power. Also, of course, there are not so many counter-attractions in smaller places to divert the direction of the will. In the expenditure on *Papers and Stamps* there should be little distinction between large towns and small, and it is satisfactory to find that here the three groups, L, A, and B, are in such close accord. An equally good test of reliability is provided by the amount put down for *Travelling Expenses*. There is no question that these are considerable in London and trifling in small towns, and that is what we find quite clearly in the table. The figures under the last head, *Repairs, Renewals, and Sundries*, are not large, and as the group is a somewhat miscellaneous one there is no point in discussing it.

Let us turn next to consider the relative figures of expenditure shown in Table V. Our object is to discover what proportion of the total expenditure is spent upon the several items: Rent and Rates, Fuel and Light, etc. The interest now lies in a comparison of the

* Fourteen per cent. of the A families were returned as having motor cars or cycles as against 39 per cent. of the B families.

TABLE V.

Amounts spent under different heads expressed as Percentages of Total Expenditure.

| Expenditure on | Percentage of Total Expenditure. | | | | |
|---|----------------------------------|------------------|-------|------------------|------------------|
| | Q ₁ . | Q ₂ . | Med. | Q ₃ . | Q ₄ . |
| Rent and Rates ... { L | 21.2 | 19.5 | 18.4 | 16.9 | 14.9 |
| ... { A | 17.3 | 15.1 | 14.3 | 13.6 | 12.4 |
| ... { B | 15.0 | 14.3 | 13.6 | 13.7 | 12.0 |
| Fuel and Light ... { L | 4.6 | 4.0 | 4.0 | 4.0 | 3.7 |
| ... { A | 5.0 | 4.7 | 4.5 | 4.3 | 3.8 |
| ... { B | 5.6 | 5.2 | 5.0 | 5.2 | 4.5 |
| Housekeeping and Ser-vice ... { L | 44.0 | 42.5 | 41.8 | 38.8 | 35.8 |
| ... { A | 45.3 | 45.5 | 42.9 | 42.3 | 39.1 |
| ... { B | 47.2 | 45.5 | 42.0 | 40.4 | 37.4 |
| Clothing ... { L | 8.1 | 9.9 | 9.3 | 10.0 | 8.9 |
| ... { A | 10.8 | 9.9 | 11.4 | 10.7 | 11.3 |
| ... { B | 10.5 | 10.4 | 11.3 | 10.4 | 10.5 |
| Education ... { L | — | — | — | 2.4 | 5.6 |
| ... { A | — | — | — | 0.5 | 3.8 |
| ... { B | — | — | — | — | 4.5 |
| Doctor, Dentist, and Chemist ... { L | 1.0 | 1.2 | 1.6 | 2.0 | 3.0 |
| ... { A | 1.8 | 1.9 | 2.4 | 3.1 | 3.9 |
| ... { B | 1.7 | 1.6 | 2.3 | 2.1 | 2.7 |
| Insurance ... { L | 3.9 | 4.7 | 5.2 | 5.4 | 4.8 |
| ... { A | 4.7 | 6.6 | 6.1 | 6.4 | 6.0 |
| ... { B | 4.5 | 5.2 | 5.6 | 6.2 | 6.0 |
| Holidays, Clubs, and Recreation ... { L | 8.1 | 8.3 | 8.9 | 8.6 | 9.1 |
| ... { A | 7.9 | 7.9 | 8.3 | 8.2 | 7.8 |
| ... { B | 9.8 | 9.9 | 10.5 | 11.4 | 10.6 |
| Subscriptions and Charities ... { L | 0.6 | 0.7 | 1.0 | 1.0 | 2.2 |
| ... { A | 0.7 | 0.8 | 1.2 | 1.2 | 1.6 |
| ... { B | 0.7 | 1.3 | 1.4 | 1.9 | 2.2 |
| Alcohol and Tobacco ... { L | 1.0 | 1.6 | 1.7 | 2.0 | 2.2 |
| ... { A | 1.8 | 2.2 | 2.4 | 2.5 | 3.1 |
| ... { B | 2.1 | 2.6 | 2.9 | 3.1 | 3.0 |
| Papers and Stamps ... { L | 1.0 | 0.7 | 0.9 | 1.0 | 0.9 |
| ... { A | 0.7 | 0.8 | 0.9 | 1.0 | 0.9 |
| ... { B | 1.1 | 1.0 | 1.1 | 1.0 | 0.9 |
| Travelling Expenses ... { L | 3.6 | 3.8 | 3.8 | 3.8 | 3.4 |
| ... { A | 1.4 | 1.9 | 2.0 | 2.1 | 2.2 |
| ... { B | 0.0 | 0.5 | 0.9 | 1.0 | 1.2 |
| Repairs, Renewals, and Sundries ... { L | 2.9 | 3.1 | 3.4 | 4.2 | 5.5 |
| ... { A | 2.5 | 2.7 | 3.6 | 4.1 | 4.1 |
| ... { B | 1.8 | 2.6 | 3.4 | 3.7 | 4.5 |
| Total ... { L | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| ... { A | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| ... { B | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

different columns, Q_1 , Q_2 , Median, Q_3 , and Q_4 , rather than in a comparison of the different rows, L, A, and B. The totals of the quintile columns, which before ascended in passing from left to right, have here all been reduced to 100 as a common denominator. This serves two purposes: (1) the extent of agreement found between the figures in the different columns for each commodity, or group of commodities, will be a measure of their value, and (2) if this agreement is not unsatisfactory, it will be of interest to get some idea as to the proportion of their income which on the average is spent by each typical, though hypothetical, family on any commodity or group of commodities.

If we examine the table row by row we see at once that there is very striking agreement in the percentages shown in the different columns. In some cases there is a slight but regular fall in the percentage as we pass from left to right, at whichever row we look, L, A, or B. This is clearly so in *Rent* and in *Housekeeping*. In other words, there is marked regression in the expenditure on *Rent and Rates* as well as on *Housekeeping and Service*: as the total expenditure rises—or, what amounts to the same thing, as the income rises—the smaller is the proportion spent upon these two items. Now these are easily the most important items in the middle-class budget. Their case may be likened to that of debenture holders who have the first claim upon whatever is to be had when a company is wound up, in that they have the first call upon income whatever may be its size; but as the income rises, and the more immediate demands for house-room and housekeeping are satisfied, other and what some might term luxury demands enter into competition with these essential requirements and so tend to depress the share which they take of income. *Heating and Lighting* may be placed in the same category as house-room, though in actual cost they form a less important group; here again there is a slight regression in relative expenditure with advance in income. *Clothing* is on a somewhat different plane to the groups already considered. Whereas a certain standard may be regarded as essential in any class of society, there is a tendency, certainly among the feminine portion of the community, to lean away from the severely necessary and towards the extravagantly desirable in dress. Hence we find that here expenditure keeps better pace with income throughout. The same is true of the expenditure on *Holidays, Clubs, and Recreation*. The practice of many *Doctors and Dentists* is to charge a patient according to the class of house in which he resides; that and the increase in average size of family account for the pretty steady progression in expenditure relative to income. In expenditure on *Insurance* we should expect to see progression with income up to about middle age, when

what may be termed saturation stage is probably reached; and there is clear correlation between age and income, as was found by a comparison of income with years of service. This expectation is borne out by the figures, relative to income, of expenditure on insurance which tend to a maximum at the Q_3 income level. There is an appreciable rise also with income in the proportion that is spent on *Subscriptions and Charities* and on *Alcohol and Tobacco*. A general rule may, in fact, be formulated: *Whereas on necessities there is regression in expenditure as the income rises, on things which are not indispensable—I hesitate to call them luxuries—there tends to be progression.*

The average amount expended on *Papers and Stamps* scarcely varies from 1 per cent. of the income at all incomes and in all places. The estimate of *Travelling Expenses*—which, it is to be remembered, includes travelling to work but excludes holiday travelling—is almost constant at 3·8 per cent. of the income in London; it is round about 2 per cent. in the large towns, and runs up to about 1 per cent. in small towns and country places. It may be said that most of these results are only what might have been anticipated. If that be so, at the least they serve to prove the trustworthiness of the estimates received and of the method adopted in their analysis.

We now pass on to the returns from housewives of the actual money spent on different kinds of food during four specified weeks in February, 1926. The quantities purchased were also not infrequently stated, but these figures were used only as a check on the money column. In the analysis the commodities shown in the copy of the form distributed were divided into eight groups, as follows:—(1) all meat, poultry, and fish, comprising the first eight items in the list together with lard and suet; (2) bread; flour; biscuits; cake and buns; (3) butter and margarine; eggs; cheese; fresh and condensed milk; (4) tea, cocoa, and coffee; (5) oatmeal, rice, sago, tapioca, etc.; (6) honey, jam, marmalade, syrup and treacle; sugar; (7) fruit, fresh and tinned; potatoes, vegetables, haricot and dried beans, etc.; (8) pickles, sauces, and condiments. Recorded among "other foods bought" were dried fruits, which were included with other fruits in group (7); cream, which was included with milk in (3); ovaltine, which was put with cocoa in (4); bovril and oxo, which were put with the meat group in (1); and such foods as force and shredded wheat, which were put with oatmeal in (5). Figures for the four items in Group (3), butter, eggs, cheese, and milk, were calculated also separately; similarly, Groups (6) and (7) were each split up into two, namely, jams and sugar, and fruit and vegetables.

Precisely the same method has been adopted in the analysis of the Part 2 figures as in Part 1, with the additional refinement

that allowance has here been made for the age and sex constitution of each family by reducing the consumption to that of one adult male as unit. The scale adopted for the reduction was one based on physiological food requirements, due to Professor Lusk of the Medical School, Cornell, U.S.A. It was the basis of reduction of the British family budgets in the 1918 enquiry, which, as already stated, was taken as the pattern in drawing up the present Part 2 form. It was also the scale adopted by the Inter-Allied Scientific Food Commission.³ According to the Lusk scale, if the consumption of the adult male is represented by 100, that of the adult female is taken to be 83; that of a child of either sex under six years of age is taken to be 50; between six and ten, 70; and between ten and fourteen, 83. For an adult of unknown sex I took 92 as the consumption figure, the average between that given for males and that given for females. The consumption of a domestic servant, if employed throughout the week, was taken to be 83, and a suitable deduction was made from this figure when employment was stated to be for only a part of the week. The total number of satisfactory returns available for analysis was 186: 39 from London, 52 from other large towns with a population exceeding 50,000, and 95 from smaller towns and country places, and these groups were treated quite independently as in the Part 1 discussion.

We may begin by recording the quintiles and median of total expenditure on food. They are as follows:—

TABLE VI.

Total Expenditure on Food in Shillings per "Adult Male" per Four Weeks.

| Type. | Q ₁ . | Q ₂ | Med. | Q ₃ . | Q ₄ . |
|-------------|------------------|----------------|------|------------------|------------------|
| London ... | 56 | 62 | 66.5 | 70 | 76 |
| A Towns ... | 50 | 61 | 63 | 66 | 76 |
| B Towns ... | 58 | 70 | 73 | 76 | 85 |

The figures for London and large towns are as close as could well be expected and the figures for the small towns are consistently in excess of the others. That the B figures should come out top was not anticipated, and possible reasons for it are such as have already been indicated in discussing the housekeeping and heating and lighting figures in Part 1, but we shall return to this point again later.

In Table VII the median and quintiles of expenditure, expressed in shillings per "adult male" per four weeks, are shown separately

TABLE VII.

Distribution of Four Weeks' Expenditure on Various Foods.

[No. of Returns :—London (L) = 39; Large Towns (A) = 52;
Small Towns (B) = 95.]

| Expenditure on | | | | Amount spent in shillings per "Adult Male." | | | | |
|----------------------|----------------|--|------|---|------------------|------|------------------|------------------|
| | | | | Q ₁ . | Q ₂ . | Med. | Q ₃ . | Q ₄ . |
| (1) Meat, etc. ... | ... | $\left\{ \begin{array}{l} L \\ A \\ B \end{array} \right.$ | 16.7 | 19.6 | 21.6 | 23.2 | 27.9 | |
| | | | 16.6 | 18.7 | 21.6 | 24.0 | 28.1 | |
| | | | 20.1 | 24.2 | 27.7 | 28.9 | 31.7 | |
| (2) Bread, etc. ... | ... | $\left\{ \begin{array}{l} L \\ A \\ B \end{array} \right.$ | 6.5 | 7.4 | 8.0 | 9.1 | 10.8 | |
| | | | 4.8 | 6.6 | 7.3 | 8.5 | 10.9 | |
| | | | 6.1 | 7.3 | 8.0 | 8.6 | 11.2 | |
| (3) | Butter ... | $\left\{ \begin{array}{l} L \\ A \\ B \end{array} \right.$ | 3.0 | 3.6 | 4.0 | 4.7 | 6.2 | |
| | | | 3.8 | 4.5 | 4.9 | 5.4 | 6.0 | |
| | | | 4.5 | 5.4 | 5.8 | 6.3 | 7.3 | |
| | Eggs ... | $\left\{ \begin{array}{l} L \\ A \\ B \end{array} \right.$ | 2.5 | 2.9 | 3.6 | 4.1 | 6.0 | |
| | | | 2.4 | 3.0 | 3.4 | 4.1 | 5.3 | |
| | | | 2.5 | 3.2 | 3.7 | 4.1 | 5.6 | |
| | Cheese ... | $\left\{ \begin{array}{l} L \\ A \\ B \end{array} \right.$ | 0.3 | 0.7 | 0.8 | 1.0 | 1.6 | |
| | | | 0.4 | 0.6 | 0.7 | 0.9 | 1.4 | |
| | | | 0.5 | 0.9 | 1.0 | 1.1 | 1.6 | |
| | Milk ... | $\left\{ \begin{array}{l} L \\ A \\ B \end{array} \right.$ | 5.6 | 6.7 | 7.6 | 8.9 | 10.8 | |
| | | | 5.4 | 6.3 | 7.0 | 7.9 | 8.7 | |
| | | | 4.8 | 5.9 | 6.7 | 7.5 | 9.0 | |
| (4) Tea, etc. ... | ... | $\left\{ \begin{array}{l} L \\ A \\ B \end{array} \right.$ | 2.0 | 2.8 | 2.9 | 3.3 | 3.9 | |
| | | | 1.7 | 2.4 | 2.8 | 3.2 | 3.8 | |
| | | | 2.5 | 3.0 | 3.3 | 3.6 | 4.7 | |
| (5) Oatmeal, etc. | ... | $\left\{ \begin{array}{l} L \\ A \\ B \end{array} \right.$ | 0.3 | 0.7 | 0.9 | 1.0 | 1.6 | |
| | | | 0.4 | 0.6 | 0.8 | 1.0 | 2.0 | |
| | | | 0.4 | 0.8 | 0.9 | 1.0 | 1.8 | |
| (6) | Jams ... | $\left\{ \begin{array}{l} L \\ A \\ B \end{array} \right.$ | 1.4 | 1.8 | 2.0 | 2.2 | 2.8 | |
| | | | 1.3 | 1.6 | 1.8 | 2.2 | 3.0 | |
| | | | 1.4 | 2.2 | 2.4 | 2.8 | 3.6 | |
| | Sugar ... | $\left\{ \begin{array}{l} L \\ A \\ B \end{array} \right.$ | 0.9 | 1.2 | 1.4 | 1.6 | 1.8 | |
| | | | 1.0 | 1.2 | 1.3 | 1.6 | 2.0 | |
| | | | 1.1 | 1.4 | 1.6 | 1.7 | 2.3 | |
| (7) | Fruit ... | $\left\{ \begin{array}{l} L \\ A \\ B \end{array} \right.$ | 3.5 | 4.3 | 5.0 | 5.5 | 8.1 | |
| | | | 3.2 | 4.4 | 4.6 | 5.0 | 7.4 | |
| | | | 3.3 | 4.6 | 5.0 | 5.6 | 8.2 | |
| | Vegetables ... | $\left\{ \begin{array}{l} L \\ A \\ B \end{array} \right.$ | 2.6 | 3.5 | 3.9 | 4.1 | 5.4 | |
| | | | 2.6 | 3.2 | 3.5 | 3.8 | 4.9 | |
| | | | 2.6 | 3.3 | 3.8 | 4.3 | 5.7 | |
| (8) Condiments, etc. | ... | $\left\{ \begin{array}{l} L \\ A \\ B \end{array} \right.$ | 0.3 | 0.6 | 1.0 | 1.4 | 2.0 | |
| | | | 0.3 | 0.5 | 0.6 | 0.8 | 2.2 | |
| | | | 0.5 | 0.8 | 1.0 | 1.2 | 2.0 | |
| Total ... | ... | $\left\{ \begin{array}{l} L \\ A \\ B \end{array} \right.$ | 45.6 | 55.8 | 62.7 | 70.1 | 88.9 | |
| | | | 43.9 | 53.6 | 60.3 | 68.4 | 85.7 | |
| | | | 50.3 | 63.0 | 70.9 | 76.7 | 94.7 | |

for each commodity or group of commodities for London, other large towns, and small towns. In 6 out of the 13 groups, namely, Meat, Butter, Cheese, Tea, Jam, and Sugar, the expenditure is highest (or equal to the highest) in the B towns for each of the five quintile and median columns. This is true also for 3 further groups, namely, Eggs, Oatmeal, and Fruit, for four out of the five columns. It may be objected that it is unsafe to argue as to expenditure generally on the slender basis of a four-weeks return, and for that reason I refrain from detailed comment upon the figures. At the same time I would point out that we are here dealing with, I believe, careful records of money actually spent: these are not mere estimates. I have tried also to allow for variable factors. Besides taking into account the constitution of each household, the fact has not been overlooked that some families keep servants and others keep hens, or grow their own vegetables and fruit. I do not claim that allowance has been made for everything, nor that, when made, it has been exact—for instance, I have added nothing when, in the Part 1 returns, there was some expenditure recorded under the heading of “meals away from home,” because there was no basis for its right apportionment—all I can claim is that I have made the best I could of the figures available and I offer them only for what they are worth. Those who may be disposed to think that they are worth little would perhaps be critical of an important part of the foundation on which was built the Sumner Report of 1918, and also the system of weights used by the Ministry of Labour in the construction of their monthly Cost-of-Living Index-Number; for, although these both depend upon returns received from a larger number of households, their returns related only to a single week's expenditure on food in each family.⁴

In Table VIII the expenditure on each item or group of foods is shown as a percentage of the total expenditure at every quintile and at the median levels. This enables us to compare the proportion of the total expenditure which went to purchase the several kinds of food, (1) in hypothetical families with different standards of living typified by Q_1 , Q_2 , Med., Q_3 , and Q_4 , resident (2) in different types of locality, L, A, and B. But it is on the first comparison that the interest now centres; the figures for the different types of locality serve merely as a check on one another. The amount of agreement disclosed in the table is surprising. When we compare the figures row by row we find absolutely no difference of any real significance between the proportions in the Q_2 , the median, and the Q_3 columns, and we need not stop to discuss such slight differences as there are.

Our results throughout the analysis of both the Part 1 and Part 2 returns have been so far satisfactory, in their general consistence

TABLE VIII.

Amounts Spent on Various Foods expressed as Percentages of Total Expenditure.

| Expenditure on | | | | Percentage of Total Expenditure. | | | | |
|--------------------------|----------------|---|---|----------------------------------|------------------|-------|------------------|------------------|
| | | | | Q ₁ . | Q ₂ . | Med. | Q ₃ . | Q ₄ . |
| (1) Meat, etc. ... | L | A | B | 36.6 | 35.1 | 34.4 | 33.1 | 31.4 |
| | | | | 37.8 | 34.9 | 35.8 | 35.1 | 32.8 |
| | | | | 39.8 | 38.4 | 39.1 | 37.7 | 33.5 |
| (2) Bread, etc. ... | L | A | B | 14.3 | 13.3 | 12.8 | 13.0 | 12.1 |
| | | | | 10.9 | 12.3 | 12.1 | 12.4 | 12.7 |
| | | | | 12.1 | 11.6 | 11.3 | 11.2 | 11.8 |
| (3) | Butter ... | L | A | 6.6 | 6.5 | 6.4 | 6.7 | 7.0 |
| | | | | 8.7 | 8.4 | 8.1 | 7.9 | 7.0 |
| | | | | 8.9 | 8.6 | 8.2 | 8.2 | 7.7 |
| | Eggs ... | L | A | 5.5 | 5.2 | 5.7 | 5.8 | 6.7 |
| | | | | 5.5 | 5.6 | 5.7 | 6.0 | 6.2 |
| | | | | 5.0 | 5.1 | 5.2 | 5.3 | 5.9 |
| | Cheese ... | L | A | 0.7 | 1.3 | 1.3 | 1.4 | 1.8 |
| | | | | 0.9 | 1.1 | 1.2 | 1.3 | 1.6 |
| | | | | 1.0 | 1.4 | 1.4 | 1.4 | 1.7 |
| | Milk ... | L | A | 12.3 | 12.0 | 12.1 | 12.7 | 12.1 |
| | | | | 12.3 | 11.8 | 11.6 | 11.5 | 10.2 |
| | | | | 9.5 | 9.4 | 9.4 | 9.8 | 9.5 |
| (4) Tea, etc. ... | L | A | B | 4.4 | 5.0 | 4.6 | 4.7 | 4.4 |
| | | | | 3.9 | 4.5 | 4.6 | 4.7 | 4.4 |
| | | | | 5.0 | 4.8 | 4.7 | 4.7 | 5.0 |
| (5) Oatmeal, etc. ... | L | A | B | 0.7 | 1.3 | 1.4 | 1.4 | 1.8 |
| | | | | 0.9 | 1.1 | 1.3 | 1.5 | 2.3 |
| | | | | 0.8 | 1.3 | 1.3 | 1.3 | 1.9 |
| (6) | Jams ... | L | A | 3.1 | 3.2 | 3.2 | 3.1 | 3.1 |
| | | | | 3.0 | 3.0 | 3.0 | 3.2 | 3.5 |
| | | | | 2.8 | 3.5 | 3.4 | 3.7 | 3.8 |
| | Sugar ... | L | A | 2.0 | 2.2 | 2.2 | 2.3 | 2.0 |
| | | | | 2.3 | 2.2 | 2.2 | 2.3 | 2.3 |
| | | | | 2.2 | 2.2 | 2.3 | 2.2 | 2.4 |
| (7) | Fruit ... | L | A | 7.7 | 7.7 | 8.0 | 7.8 | 9.1 |
| | | | | 7.3 | 8.2 | 7.6 | 7.3 | 8.6 |
| | | | | 6.6 | 7.3 | 7.1 | 7.3 | 8.7 |
| | Vegetables ... | L | A | 5.7 | 6.3 | 6.2 | 5.8 | 6.1 |
| | | | | 5.9 | 6.0 | 5.8 | 5.6 | 5.7 |
| | | | | 5.2 | 5.2 | 5.4 | 5.6 | 6.0 |
| (8) Condiments, etc. ... | L | A | B | 0.7 | 1.1 | 1.6 | 2.0 | 2.2 |
| | | | | 0.7 | 0.9 | 1.0 | 1.2 | 2.6 |
| | | | | 1.0 | 1.3 | 1.4 | 1.6 | 2.1 |
| Total ... | L | A | B | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| | | | | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| | | | | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

as tested in different ways, that we may have some confidence now in venturing another step and in combining the experience of London, the large towns, and the small towns, in order to get some idea of the distribution of normal expenditure averaged over the whole country for the particular sample of middle-class families we have had under discussion. To do this a weighted median has been calculated of the L, A, and B percentages in each column for each item of expenditure in Tables V and VIII. The weights used were 1, 3, and 4 for the L, A, and B figures, these numbers being very roughly proportional respectively to the 1921 census populations in London Administrative County, in the aggregate of towns with a population exceeding 50,000, and in other towns and rural districts.⁵ The rural districts were included under the last head because families living in them are mainly dependent for their purchases upon shops in the nearest small towns or villages.

If we consider, first of all, the distribution of total expenditure, the results are as shown in Table IX. When these are examined row by row it is clear that the proportion of the income spent on many items is much the same at whichever column we look, *i.e.* whether we consider a hypothetical family with a relatively low or a relatively high total expenditure. The percentages in the three central columns, Q₂, Med., and Q₃, indeed, are in general so nearly identical, allowing for differences due to random sampling, that they may, I think, be accepted as closely representative of the estimated normal expenditure in this sample of middle-class families. Taking, then, the figures of median expenditure and expressing them to the nearest $\frac{1}{2}$ per cent., the result may be set down as in Table X.

This indicates that Housekeeping and Service account in round numbers for 40 per cent. of the total spent in the year; Rent, Rates, Fuel, and Light between them account for another 20 per cent.; Clothing for 10 per cent.; Holidays, Clubs, and Recreation together reach about the same figure. There is then a drop down to 5 per cent. for Insurance, and the rest of the amounts individually are comparatively trifling.

By the kindness of Mr. L. R. Connor and Mr. B. Archer I have been put in possession of figures, on lines somewhat similar to those we have just been considering, in regard to the cost of living as it affected higher-grade Civil Servants a few years ago. In March, 1920, the Association of H.M. Inspectors of Taxes (or the Association of Tax Surveying Officers, as it was then named) made a collection of some 200 family budgets from their members. These budgets were grouped, according to the incomes represented, in £100 ranges running from £301 to over £1,000, and the expenditure was analyzed for each group under several headings. In 1922 the enquiry was

TABLE IX.

Percentage Distribution of Expenditure for L, A, and B combined.

| Expenditure on | Percentage of Total Expenditure. | | | | |
|--|----------------------------------|------------------|-------|------------------|------------------|
| | Q ₁ . | Q ₂ . | Med. | Q ₃ . | Q ₄ . |
| Rent and Rates | 16.6 | 15.2 | 14.5 | 14.1 | 12.5 |
| Fuel and Light | 5.2 | 4.9 | 4.7 | 4.7 | 4.1 |
| Housekeeping and Service ... | 46.1 | 45.1 | 42.3 | 40.9 | 37.8 |
| Clothing | 10.3 | 10.1 | 11.1 | 10.5 | 10.6 |
| Education | — | — | — | 0.5 | 4.4 |
| Doctor, Dentist, and Chemist | 1.7 | 1.7 | 2.3 | 2.5 | 3.2 |
| Insurance | 4.5 | 5.7 | 5.7 | 6.2 | 5.9 |
| Holidays, Clubs, and Recreation | 8.9 | 9.0 | 9.5 | 9.8 | 9.4 |
| Subscriptions and Charities... | 0.7 | 1.0 | 1.3 | 1.5 | 2.0 |
| Alcohol and Tobacco | 1.9 | 2.3 | 2.6 | 2.7 | 2.9 |
| Papers and Stamps | 0.9 | 0.9 | 1.0 | 1.0 | 0.9 |
| Travelling | 1.0 | 1.4 | 1.7 | 1.8 | 1.8 |
| Repairs and Renewals | 2.2 | 2.7 | 3.5 | 3.9 | 4.5 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

TABLE X.

Estimated Distribution of Normal Expenditure in a Particular Sample of Middle-class Families.

| Expenditure on | Percentage of Total Expenditure. |
|--|----------------------------------|
| Housekeeping and Service | 42.5 |
| Rent and Rates | 14.5 |
| Fuel and Light | 4.5 |
| Clothing | 11.0 |
| Holidays, Clubs, and Recreation | 9.5 |
| Insurance | 5.5 |
| Doctor, Dentist, and Chemist | 2.5 |
| Alcohol and Tobacco | 2.5 |
| Subscriptions and Charity | 1.5 |
| Travelling | 1.5 |
| Papers and Stamps | 1.0 |
| Repairs, Renewals, and Sundries | 3.5 |

repeated in conjunction with four other Associations of Civil servants, but it dealt then specifically with incomes from £750 upwards; as these incomes are beyond even the highest quintile points in my Table III, we need not stop to consider the results of the later enquiry. It is perhaps worth while, however, to examine the distribution of expenditure revealed by the earlier budgets for the particular range of incomes £401 to £500, as this range includes the

three medians in Table III. The number of budgets in this group would be probably between 30 and 40.

The expenditure was analyzed under the following heads : Income Tax, Food, Housing, Clothing, Education, Medical Attendance, Relaxation and Holidays, Insurances, Travelling, and Miscellaneous. It will be noted that these headings are very similar to my own, but there are some important differences in their contents. Housing, for instance, here includes among other things, Rent and Rates, Fuel and Light, and Repairs, while the Miscellaneous group includes Subscriptions and Charities, all of which I listed separately. On the other hand, Food is not listed separately by me, but comes under Housekeeping. To get a fair comparison it is therefore necessary to combine certain of my groups and to run Food and Housing together in the other list. Furthermore, Income Tax and Education must be omitted, as they do not appear in my table, and Alcohol, as it does not appear in the other. For the omission of Alcohol an estimate had to be made. The figures submitted by the Colwyn Committee on National Debt and Taxation indicate that within the range of incomes under consideration the average annual expenditure on alcohol is, very roughly, about three times that on tobacco.⁶ I accordingly took one-quarter of the amount expended on Alcohol and Tobacco in my list and added it to the figure attributed to Holidays and Recreation, this being the heading under which tobacco appeared in the Civil Service tabulation. When these adjustments are made we are left with six different heads of expenditure, and the distribution under them is as follows : —

TABLE XI.

| | Relative Expenditure upon | | | | | |
|---|--|-----------|------------------|-----------|-----------------------------|-------------|
| | Rent and Rates, Fuel and Light, Housekeeping and Services, etc. | Clothing. | Medical, etc. | Insurance | Holidays and Recreation. | Travelling. |
| Assocn. of H.M. Inspectors of Taxes ... | 66 | 11½ | 3 | 6 | 10½ | 3 |
| D. C. J. ... | 67½ | 11½ | 2½ | 6 | 11½ | 1½ |

One could hardly have hoped for better agreement between the results of the two analyses. It is a testimony, I think, to the value of even small samples in such enquiries when the budgets are compiled with reasonable care.

Now it is a fact not generally appreciated by those who are not immediately concerned, that incomes in the higher as well as in the

lower grades of the Civil Service are to some extent governed according to a sliding scale by the movement of the Ministry of Labour Cost-of-Living Index-Number. It is therefore of interest to enquire how far weights based on working-class expenditure are applicable to middle-class families. We shall, therefore, next compare the median distribution of expenditure in our selected sample of middle-class families with the estimates of working-class expenditure made by (1) the Ministry of Labour,⁷ applicable to 1914, and by (2) the Sumner Committee⁸ appointed to enquire into the increase since July, 1914, in the cost of living of the working classes in 1918.

It is the first of these estimates which the Ministry of Labour use as the basis of weighting in their official monthly computation. These weights, it is scarcely necessary to explain, are merely factors by which the changes in price of different groups of commodities are multiplied in averaging such changes together, so that the contribution of each to the average is made greater or less according to its importance. The measure of the importance of each group is in this case decided by the proportion it represents in the pre-war expenditure of the normal working-class family, which expenditure is analyzed under five heads—food, rent, clothing, fuel and light, and other items. Under the last head are included soap and soda; domestic ironmongery, brushware and pottery; tobacco and cigarettes; fares; and newspapers. These do not by any means comprehend all the multitude of things upon which even a working-class family might spend a part of their income—beer and cinemas may be cited as two obvious and not unimportant omissions—and that is indeed made clear by the Ministry, but it is pointed out that the percentage change in the price of those things which are not included is unlikely to differ much from the change in price of those which are. I have drawn special attention to this, though it does not concern our discussion directly, lest it should be thought that the figures of proportional pre-war expenditure adopted for weighting purposes by the Ministry are equally limited in content. This is not so, but whether there is any limitation and, if so, its extent are points which are not, I think, made quite clear in the published accounts of the computation.

To determine the proportion of working-class income spent upon food the Ministry of Labour used the Board of Trade budgets of 1904. The Sumner Committee also made use of these budgets, but they appear to have subjected them to a fresh analysis. Both the Sumner Committee and the Ministry of Labour made independent estimates of expenditure on rent and rates, clothing, fuel and light, concerning which no information was given in the budgets published by the Board of Trade. The miscellaneous group was split up into

three parts by the Sumner Committee: sundries, fares, and insurance. They definitely excluded anything spent on recreation, beer, tobacco, and similar personal expenses. Sundries included paraffin, candles, matches, firewood, and cleaning materials. Insurance meant contributions to trade unions, Friendly Societies, and Industrial Insurance Companies in addition to National Insurance. This receives no specific mention in the Ministry of Labour's estimates, and in any case the 1s. a week allotted to "Other Items" would scarcely suffice even in 1914 to cover insurance as well as other expenditure which does not fall under any of the four main heads.

Now it is possible to divide our sample of middle-class expenditure also into five groups, the first four of which—food, rent and rates, clothing, and fuel and light—will be reasonably comparable with the corresponding working-class groups in the sense that things of the same kind are covered by these headings. But that is not true of the fifth, or miscellaneous, group. This group is not, relative to the rest of the expenditure, an important one in the working-class budget, and therefore it does not so much matter if its content is not quite the same in the Ministry of Labour and in the Sumner analysis. A glance at Table X, however, shows that in the aggregate it constitutes a proportion that is by no means negligible of middle-class expenditure. In short, in this group we are not really comparing the same things in the several budgets: it must be regarded simply as the residue of a given total expenditure after accounting for the first four groups, and by no means a complete residue in the wage-earners' budget. As that is not altogether satisfactory, the first four groups have also been shown in Table XII as percentages of a total with the miscellaneous group omitted altogether for each class of families. It will have been observed that food in the Part 1 forms was included under Housekeeping and Service, and it was therefore necessary to make use of the Part 2 forms to get an estimate of the amount spent on food. The total expenditure on food is shown in shillings per adult male for four weeks at the median points in each type of area. These figures were first multiplied by $13/20$ in order to express them in £'s per annum. Next it was necessary to allow for the size of family. Since it is only the medians of expenditure that we are here discussing, the most appropriate measure of the number of "adult males" in the L, A, and B groups is given by the figures in the median column of Table II, namely, 2.5, 3.4, and 3.2 respectively. Using these as multiplying factors, estimates of the expenditure per family on food were obtained, and the final results, when the L, A, and B figures are combined, are shown in percentage form in the last column of Table XII.

TABLE XII.

*Comparison of Working-class and Middle-class Percentage
Distribution of Expenditure.*

| Group. | 1911 Expenditure at 1911 Prices. | | | | 1914 Expenditure at 1926 Prices. | | | | 1926, (comp.) | 1926, D. C. J. |
|----------------|----------------------------------|-------------------|---------------|----------|----------------------------------|-------------------|---------------|----------|---------------|----------------|
| | Ym of Lib. | Summer Committee. | | | Ym of Lib. | Summer Committee. | | | | |
| | | Unskilled. | Semi-skilled. | Skilled. | | Unskilled. | Semi-skilled. | Skilled. | | |
| Food ... | 63 | 63½ | 63 | 62 | 60½ | 61 | 61 | 59 | 51 | 51 |
| Rent ... | 17 | 17 | 17 | 17 | 14 | 15 | 14 | 14 | 21 | 23 |
| Clothing ... | 14 | 12½ | 14 | 16 | 17 | 16 | 18 | 21 | 21 | 18 |
| Fuel and Light | 6 | 7 | 6 | 5 | 8½ | 8 | 7 | 6 | 7 | 8 |
| Food ... | 60 | 57 | 56 | 55 | 59 | 55 | 54 | 53 | 38½ | 32 |
| Rent ... | 16 | 15 | 15 | 15 | 13 | 13 | 13 | 13 | 16 | 14½ |
| Clothing ... | 12 | 11 | 13 | 14 | 17 | 15 | 17 | 18 | 16 | 11 |
| Fuel and Light | 8 | 6½ | 5½ | 5 | 8 | 7 | 6 | 5 | 5 | 4½ |
| Miscellaneous | 4 | 10½ | 10½ | 11 | 3 | 10 | 10 | 11 | 24½ | 38 |

In the adjacent column is given an estimate due to Mr. Norman Crump based upon a careful analysis of 29 budgets supplied to him by members of the Post Office Sorters' Guild. Mr. Crump has written an interesting account of his investigation, which he very kindly allowed me to read, and it is from that material that I computed the figures shown under his name. The budgets themselves were handed in as evidence to the Industrial Court which was conducting an enquiry regarding Post Office wages in the early part of last year (1927), and before which Mr. Norman Crump appeared as an expert witness. There is close agreement between his figures and my own when the four main heads of expenditure are considered independently of the fifth (miscellaneous) head. The agreement is perhaps rather too close. I should have preferred to see Mr. Crump's figures coming in between those which refer to working-class families and those which refer to families which are definitely middle-class.* The introduction of the miscellaneous group certainly upsets the agreement, and that is natural, because it is not difficult to invent miscellaneous ways of spending additional income when there is additional income to spend. I do not think

* The comparison would be fairer if my London figures alone were taken here, as the majority of the Post Office sorters concerned lived in London. That would have the effect of raising the rent and lowering the food percentages in the last column, and so improving the gradations in the first two rows.

Mr. Crump's miscellaneous group was intended to be quite exhaustive, though it comprised most of the things listed by me. I rather fancy that alcohol, for instance, was designedly omitted by him.

The Sumner Committee divided their budgets into five classes, three of which represented the families of skilled, semi-skilled, or unskilled workers, and these are shown separately in Table XII. Figures of expenditure were given for 1914 and 1918, but, as rationing still affected the supplies of certain commodities in 1918, the figures for that year are not reproduced here. Since my own figures and those of Mr. Crump refer to 1926, percentages are given for the Ministry of Labour and the Sumner Committee estimates, showing not only the actual expenditure in 1914 but also what this would represent at 1926 prices.⁹ Price changes, of course, themselves affect expenditure, but of that effect no measure is available in this case.

The top half of the table indicates, as we have seen before, that when the essential needs of food and shelter are met there is room for expansion in other directions. Thus a greater proportion of the income is expended on clothing in the skilled than in the unskilled class, and the proportion spent on food diminishes as we pass from left to right. The bottom half of the table, imperfect though the comparison is, does give some indication of the importance of the miscellaneous group as the income rises; moreover, the figures in the first and last rows are quite regular in trend. There is regression in expenditure on food and, in the lower income levels, on fuel and light, but steep progression in other (miscellaneous) expenditure with rise in income.

To return now to the question raised on p. 23, the conclusion to be drawn from a comparison between the Ministry of Labour weights in the first column and my weights in the last column of Table XII (lower half) is that the former are by no means applicable to this particular sample of middle-class families. In particular, they appear to attribute to food nearly double the importance it should have, and they make very inadequate allowance for the miscellaneous expenditure, which is relatively so much more important to the middle-class than it is to the working-class family. In fairness to those who are responsible for the official computation it should be added that I do not think they would for a moment claim that their weights have any reference at all to the middle classes. On the contrary, in every issue of the *Labour Gazette* they are most careful to state in italics that their Index-Number is designed to show the *average increase in the cost of maintaining unchanged the pre-war standard of living of working-class families*. At the same time it

must be made clear to anyone who might be tempted to lay too much stress on the above conclusion, that an appropriate choice of weights, though not unimportant, has very much less influence upon the final result than an accurate determination of prices, and price changes affect all classes alike, though possibly in unequal degrees.

It will be of interest to examine next the expenditure on various kinds of food in our middle-class budgets averaged over the whole country. The same procedure as before was followed to combine the L, A, and B data, the median L, A, and B percentages of expenditure being weighted in the proportions 1, 3, and 4, with the result shown in Table XIII.

TABLE XIII.

Comparison of Working-class and Middle-class Expenditure on Food.

| Group. | | | | | (1911) Sumner Committee. | (1926) D. C. J. |
|------------------|-----|-----|-----|-----|-----------------------------|--------------------|
| | | | | | Per cent. | Per cent. |
| Meat, etc. | ... | ... | ... | ... | 31.5 | 37.0 |
| Bread, etc. | ... | ... | ... | ... | 19.0 | 12.0 |
| Butter | ... | ... | ... | ... | 9.0 | 8.0 |
| Eggs | ... | ... | ... | ... | 4.5 | 5.5 |
| Cheese | ... | ... | ... | ... | 2.5 | 1.5 |
| Milk | ... | ... | ... | ... | 6.0 | 10.5 |
| Fruit | ... | ... | ... | ... | 2.5 | 7.5 |
| Vegetables | ... | ... | ... | ... | 7.0 | 5.5 |
| Jam | ... | ... | ... | ... | 3.0 | 3.0 |
| Sugar | ... | ... | ... | ... | 4.5 | 2.0 |
| Tea, etc. | ... | ... | ... | ... | 0.5 | 4.5 |
| Oatmeal, etc. | ... | ... | ... | ... | 2.5 | 1.5 |
| Condiments, etc. | ... | ... | ... | ... | 1.5 | 1.5 |

According to these figures it is clear that the meat group, comprising also, it will be remembered, fish, poultry, bacon, and other meat products, is the most expensive in the dietary, accounting for 37 per cent. of the whole. The dairy group—milk, butter, eggs, and cheese, in order of importance—comes next, with an expenditure of about two-thirds that of the first group. Fruit and vegetables cost between them about half as much as the dairy group; and bread, including also cakes and biscuits, stands on much the same level. There is then a drop to about 5 per cent. for jam and sugar, and for tea and like drinkables. Oatmeal and such foods represent $1\frac{1}{2}$ per cent. of the total, and so also do condiments.

These results, again, may be compared with similar information provided by the Sumner Committee⁸ concerning working-class families in 1914. The latter related to the weekly expenditure of a

standard family containing 4.57 "men," and the figures accordingly would have to be multiplied by 4/4.57 to make them comparable with those for middle-class families in Table VII; but here we are only concerned with relative, not absolute, expenditure. Further, a small entry, "other food," appeared in the Summer table, two-thirds of which, it is estimated, was made up of haricots, honey, and dried fruits. When allowance was made for this, and another entry, "meals out," was deleted, it was possible to group all items in the manner adopted in Table XIII and to reduce their cost to percentages of the total. This having been done, some striking differences are found between the two distributions. Expenditure on the meat group drops from 37 per cent. for middle-class families to 31½ per cent. of the whole for working-class families, and expenditure on fruit and vegetables drops from 13 to 9½ per cent. There is also a reduction in what is spent on the dairy group, chiefly due to milk, which stands now at 6 instead of at 10½. On the other hand, expenditure on bread, on tea, and on sugar is substantially increased. The appreciably higher consumption of taxed commodities, sugar and the tea group, on the part of the relatively poor calls for special notice, seeing that the Colwyn Committee and other investigators, in attempting to arrive at the incidence of taxation on incomes of different amounts, based their estimates of food consumption for all classes in the main on an analysis of working-class budgets. In the light of these figures I think I may take credit to myself for having departed from that procedure in my own discussion of the subject before this society last year.¹⁰

Attention has been drawn more than once in the course of this paper to a higher expenditure on certain things by families of much the same type in small towns as compared with large towns. It would appear that this might be accounted for in either of two ways or in a combination of both. It might be due to a difference in the standard of living as between families resident in the large towns and the small, or it might be due to a difference in prices as between the large towns and the small. The difference, in short, might be in the quantities of different commodities purchased or in their cost.

Now a higher standard of living would naturally result in the smaller towns if on the average the incomes enjoyed in such towns exceeded those enjoyed in large towns, and it may be suggested that high expenditure is simply a reflection of high income. In order to test this, not having exact knowledge with regard to private incomes, I treated salaries as I had treated expenditure and picked out the quintiles in the three groups, L, A, and B, with the following result ;—

TABLE XIV.

Variation in Salary according to Type of Locality.

| Type. | No. of Returns | Total Salary in £'s per annum. | | | | |
|----------------|----------------|--------------------------------|------------------|------|------------------|------------------|
| | | Q ₁ . | Q ₂ . | Med. | Q ₃ . | Q ₄ . |
| London | 50 | 372 | 432 | 474 | 509 | 577 |
| A Towns | 62 | 343 | 392 | 449 | 484 | 524 |
| B Towns | 123 | 332 | 420 | 443 | 468 | 624 |

Thus, the B towns come at the bottom of the list in three columns of the table and next to the bottom in a fourth. When these figures are compared with those of total expenditure in Table III, and especially with those of expenditure per head on food in Table VI, where the B towns come uniformly at the top of the list, it does not appear that a difference in salary can in general account for the whole difference in expenditure, although it most probably accounts for a great part of it in the top quintile (Q₄) group. Moreover, it would, I think, be unreasonable to assume that the standard of consumption in households of members of the same profession, and of about the same salary grade, differs greatly from A to B, although this might be true in certain cases. For instance, it might be argued that life in large towns is as a rule more confined and more sedentary than that in small towns and country places; persons under the latter conditions enjoy in comparison a free open-air life, which promotes appetite and so leads to a higher consumption of satisfying foods such as meat. Whether that is so or not would be an interesting subject of enquiry. That sort of influence, it is clear, might be an important one if we were comparing outdoor country and indoor town workers, but it is of much less importance when we are concerned solely with indoor workers of one special type.

Of the two explanations proposed it therefore seemed likely that the one which attributed the difference in expenditure to a difference in prices would be the more weighty. Now it has usually been accepted as an axiom that the cost of living is quite definitely less in small towns and country places than in large towns, and this assumption has had some influence in the past on the determination of wages and salaries as between persons residing in towns of different size. I was therefore not content to leave where it was the question which my results had raised as to the truth of the axiom. To examine it thoroughly, wide and by no means easy research would be necessary. In what follows I have done no more than attempt to float one or two light feathers in the air to find in what direction the wind appeared to blow.

We have already referred to the Cost-of-Living Index published in each issue of the *Labour Gazette*. The calculation of these indices is based upon information as to prices which is obtained month by month. For the benefit of those who are not acquainted with the procedure followed I cannot do better than quote two or three paragraphs from an address delivered to the Manchester Statistical Society by Mr. John Hilton, the Director of Statistics at the Ministry of Labour, describing how food prices are determined.¹¹

“Information as to the predominant retail prices of . . . articles of food is collected at the beginning of each month, by the Managers of Employment Exchanges and Branches, from representative retailers (including co-operative societies, large ‘multiple’ firms, and private shopkeepers) conducting a working-class trade. Information is obtained in all towns with a population exceeding 50,000 at the Census of 1911, and in a representative selection of 530 smaller towns and villages distributed throughout the United Kingdom. Altogether 620 towns and villages are reported upon. The total number of retailers from whom information as to prices of food is collected is about 5,500 at present, but this is not a full indication of the basis of the returns, as many of these retailers have a number of shops at which identical prices are maintained. In some cases also prices are so regulated by arrangement among traders that an article is sold at uniform price throughout a locality, the price being known to everybody.

“The general procedure is for some officer appointed by the Manager of the Employment Exchange to go out on the first day of each month, call at shops which have already been decided upon as being representative working-class shops in the district, and ascertain the prices on that date of the list of articles contained on his schedule. Having made his round, he reports to us the predominant prices ruling at the shops visited for each of the articles. In saying ‘predominant’ instead of ‘average,’ I mean that we do not ask him to add up the prices charged at all the shops and strike an average. I mean that he reports the price or prices most generally prevailing at the shops visited for each of the items. There are always occasional shops where something is being sold very cheaply, perhaps as a temporary ‘draw’; and you may find other odd shops where some items are for the moment disproportionately dear; but in general there is a sort of standard local price or a narrow range of prices, and that is what the Exchange officer is required to report. This is as good for the purpose as an average, and is much simpler.

“It may be said that this method of collecting food-price information leaves a good deal to the Employment Exchange officer, who, with all his virtues, is not infallible. That is true, but experi-

ence shows that the Exchange officer is to be relied upon. Published price lists and occasional supplementary investigation afford material for sample tests of accuracy. Every return received is subjected to critical examination, and dubious entries are immediately made the subject of supplementary enquiries. Of this we can be sure, there is no conscious bias in the returns, no attempt to represent the figures as higher or lower than they, in fact, are, and where there is no bias any minor errors which are not evident to the eye of the scrutinizer will tend to cancel each other out."

It is clear from this account that we have here quite an unbiassed selection of prices of commodities representative of the kind and quality that are purchased by the working classes, and, what is of importance for our present purpose, in averaging these prices together large towns are distinguished from small towns and villages, a population of 50,000 marking the boundary line between small and large as in my own data. Unfortunately, however, this distinction is not preserved in the price figures which are published in the *Labour Gazette*: actual prices are only given for all towns combined, although the percentage increase in price as compared with July, 1914, is given separately for large towns and for small towns and villages as well as for all combined. I therefore wrote to the Ministry of Labour to ask if they could without much trouble let me have price figures at one or two specified dates in recent years for London, large towns (as above defined), and small towns, separately. They very courteously supplied me with the information I wanted for January 1st and July 1st in each of the four years 1923 to 1926, and, while I alone am responsible for the use made of the figures, I should like to acknowledge my appreciation of the trouble taken by the Ministry to further a purely private enquiry of this nature.

The data relate to food only, and it is to be observed that London is included with other large towns in addition to being shown separately. Of beef and mutton four varieties are recorded: ribs and thin flank, British, and chilled or frozen. The remaining commodities are bacon (streaky), flour, bread, tea, sugar (granulated), milk, butter (fresh and salt), margarine, cheese, eggs (fresh), and potatoes. For meat and bacon the prices were all expressed per lb., and these were added together to give a price figure for the meat group as a whole; this in effect was equivalent to finding the arithmetic mean of the nine different quotations but without dividing by the nine. In the same way a combined figure was obtained for flour and bread, and for fresh butter, salt butter, and margarine. The results are shown in Table XV for each commodity or group of commodities, and at each of the given dates in January and July, 1923 to 1926. Now, clearly, if there are no very persistent causes

TABLE XV.

Predominant Retail Prices for Food-stuffs in Shops and Stores frequented by Working-class People.

(From data kindly supplied by the Ministry of Labour.)

| Group. | Year. | 1st January. | | | 1st July. | | |
|--------------------------|-------|--------------------------------|--------------------------------|--------------------------------|-------------------------------|--------------------------------|-------------------------------|
| | | London (L.) | Large Towns (L.) | Small Towns (L.) | London (L.) | Large Towns (L.) | Small Towns (L.) |
| Beef, Mutton, and Bacon. | 1926 | 9/0 ¹ ₂ | 9/3 ¹ ₂ | 9/5 ¹ ₂ | 8/11 | 9/0 ¹ ₂ | 9/2 ¹ ₂ |
| | 1925 | 9/0 ¹ ₂ | 9/2 ¹ ₂ | 9/5 ¹ ₂ | 8/11 | 9/3 ¹ ₂ | 9/5 ¹ ₂ |
| | 1924 | 8/6 ¹ ₂ | 8/9 ¹ ₂ | 9/0 ¹ ₂ | 8/5 | 8/10 | 9/1 ¹ ₂ |
| | 1923 | 9/4 ¹ ₂ | 9/5 ¹ ₂ | 9/7 ¹ ₂ | 8/11 | 9/0 ¹ ₂ | 9/3 ¹ ₂ |
| Bread and Flour. | 1926 | 2/4 ¹ ₂ | 2/4 ¹ ₂ | 2/3 ¹ ₂ | 2/5 ¹ ₂ | 2/4 ¹ ₂ | 2/4 ¹ ₂ |
| | 1925 | 2/5 ¹ ₂ | 2/4 ¹ ₂ | 2/4 ¹ ₂ | 2/5 ¹ ₂ | 2/5 ¹ ₂ | 2/5 ¹ ₂ |
| | 1924 | 1/11 ¹ ₂ | 1/11 | 1/11 ¹ ₂ | 2/0 ¹ ₂ | 1/11 ¹ ₂ | 2/0 ¹ ₂ |
| | 1923 | 2/2 | 2/1 ¹ ₂ | 2/1 ¹ ₂ | 2/1 ¹ ₂ | 2/0 ¹ ₂ | 2/0 ¹ ₂ |
| Tea. | 1926 | 2/2 ¹ ₂ | 2/3 ¹ ₂ | 2/6 ¹ ₂ | 2/3 | 2/4 ¹ ₂ | 2/6 ¹ ₂ |
| | 1925 | 2/3 | 2/4 ¹ ₂ | 2/6 ¹ ₂ | 2/3 | 2/4 ¹ ₂ | 2/6 ¹ ₂ |
| | 1924 | 2/4 ¹ ₂ | 2/5 ¹ ₂ | 2/7 ¹ ₂ | 2/1 | 2/2 | 2/3 |
| | 1923 | 2/3 | 2/4 ¹ ₂ | 2/6 ¹ ₂ | 2/4 ¹ ₂ | 2/5 ¹ ₂ | 2/7 ¹ ₂ |
| Sugar. | 1926 | 3 ¹ ₂ | 3 ¹ ₂ | 3 ¹ ₂ | 3 ¹ ₂ | 3 ¹ ₂ | 3 ¹ ₂ |
| | 1925 | 4 | 4 | 4 ¹ ₂ | 3 ¹ ₂ | 3 ¹ ₂ | 3 ¹ ₂ |
| | 1924 | 6 ¹ ₂ | 6 ¹ ₂ | 6 ¹ ₂ | 4 ¹ ₂ | 4 ¹ ₂ | 4 ¹ ₂ |
| | 1923 | 5 ¹ ₂ | 5 ¹ ₂ | 6 | 7 | 7 ¹ ₂ | 7 ¹ ₂ |
| Butter and Margarine. | 1926 | 4/5 ¹ ₂ | 4/7 | 4/8 ¹ ₂ | 4/3 ¹ ₂ | 4/4 ¹ ₂ | 4/4 ¹ ₂ |
| | 1925 | 4/9 ¹ ₂ | 4/11 ¹ ₂ | 5/0 ¹ ₂ | 4/5 | 4/6 ¹ ₂ | 4/5 ¹ ₂ |
| | 1924 | 4/7 ¹ ₂ | 4/9 ¹ ₂ | 4/11 ¹ ₂ | 4/1 ¹ ₂ | 4/3 | 4/2 ¹ ₂ |
| | 1923 | 4/6 ¹ ₂ | 4/7 ¹ ₂ | 4/9 ¹ ₂ | 3/7 ¹ ₂ | 3/8 ¹ ₂ | 3/8 ¹ ₂ |
| Milk. | 1926 | 7 | 7 | 6 ¹ ₂ | 6 | 5 ¹ ₂ | 5 ¹ ₂ |
| | 1925 | 7 | 7 | 6 ¹ ₂ | 6 | 5 ¹ ₂ | 5 ¹ ₂ |
| | 1924 | 8 | 7 ¹ ₂ | 6 ¹ ₂ | 6 | 5 ¹ ₂ | 5 ¹ ₂ |
| | 1923 | 8 | 7 ¹ ₂ | 6 ¹ ₂ | 6 | 5 ¹ ₂ | 5 ¹ ₂ |
| Eggs. | 1926 | 3/2 ¹ ₂ | 3/3 | 3/3 | 1/7 | 1/6 ¹ ₂ | 1/6 |
| | 1925 | 2/11 ¹ ₂ | 3/1 | 3/0 ¹ ₂ | 1/9 ¹ ₂ | 1/9 ¹ ₂ | 1/9 |
| | 1924 | 3/1 ¹ ₂ | 3/4 ¹ ₂ | 3/3 ¹ ₂ | 1/8 ¹ ₂ | 1/9 | 1/8 ¹ ₂ |
| | 1923 | 3/4 | 3/3 ¹ ₂ | 3/2 | 1/7 ¹ ₂ | 1/7 ¹ ₂ | 1/7 |
| Cheese. | 1926 | 1/2 | 1/3 ¹ ₂ | 1/3 ¹ ₂ | 1/1 | 1/1 ¹ ₂ | 1/2 |
| | 1925 | 1/0 ¹ ₂ | 1/2 | 1/2 | 1/0 ¹ ₂ | 1/1 ¹ ₂ | 1/1 ¹ ₂ |
| | 1924 | 1/1 ¹ ₂ | 1/3 | 1/3 ¹ ₂ | 1/0 ¹ ₂ | 1/0 ¹ ₂ | 1/1 |
| | 1923 | 1/2 ¹ ₂ | 1/3 ¹ ₂ | 1/3 ¹ ₂ | 1/0 ¹ ₂ | 1/1 | 1/1 ¹ ₂ |
| Potatoes. | 1926 | 8 ¹ ₂ | 7 ¹ ₂ | 6 ¹ ₂ | 9 ¹ ₂ | 9 ¹ ₂ | 9 |
| | 1925 | 10 ¹ ₂ | 10 ¹ ₂ | 10 ¹ ₂ | 10 ¹ ₂ | 10 ¹ ₂ | 11 ¹ ₂ |
| | 1924 | 8 ¹ ₂ | 7 ¹ ₂ | 7 ¹ ₂ | 1/0 ¹ ₂ | 1/2 | 1/3 |
| | 1923 | 5 ¹ ₂ | 5 | 5 | 8 ¹ ₂ | 8 ¹ ₂ | 9 |

* Including London.

differentiating large towns from small in regard to price, we should expect at some dates the L prices, at other dates the A prices, and at other dates the B prices to be highest. If, on the other hand, there are certain persistent factors at work favouring large towns or small, then, unless they are so insignificant as to be overlaid by other factors of more importance, that should be reflected in the consistency with which the L, A, or B prices come out at the top. Turning to Table XV, what do we find? We find, with one trifling exception, the B prices are invariably highest in precisely those groups which were singled out in Table VII also as showing the highest expenditure in small towns (see pp. 478, 479). *At each of the given eight dates* the B prices are the maximum (or equal to the maximum) prices quoted in all the following groups:—meat, tea, sugar, cheese. Of the butter group the same is true except for a difference on three dates ranging from $\frac{1}{4}d.$ to $\frac{3}{4}d.$ on a sum exceeding 4s. Moreover in all these five groups the London prices at every date are the lowest or equal to the lowest. In this respect my own figures were not quite so regular. Let us next look at a commodity where these conditions are reversed. For milk the prices are highest in London at each date and lowest in the small towns, and that also is true of expenditure in Table VII. For the bread group too the prices are highest in London, while A and B are largely on a level; in Table VII, the figures of expenditure are in general highest in London and lowest in the A towns. For the remaining two groups, eggs and potatoes (which in Table VII are included with all other vegetables), L and B are much on a level in expenditure (Table VII), but the A towns are generally at the bottom, while the differences in prices (Table XV) are irregular, changing according to the time of year. In order to summarize the data supplied by the Ministry of Labour it is possible to average together for each group the prices at the eight given dates and to express the results as percentages of the London averages. This has been done in Table XVI, which brings out very clearly the differentiation in price between small towns and large and the measure of agreement between this and the corresponding differentiation in expenditure disclosed in Table VII.

The price differences are nowhere large and I do not wish to exaggerate them. Indeed, the average variations between prices in different towns for some articles are said to be sometimes less than the variations as between different shops in the same town, or even less than the variations in price for different descriptions of an article in the same shop.¹² Moreover, the Ministry of Labour figures relate to prices in shops of the kind which are patronised by working-class people, while my own figures relate to the expenditure of middle-class families. Nevertheless, the remarkable consistency

TABLE XVI.

Predominant Mean Prices for Food-stuffs, January and July, 1923-26, in Large Towns (including London) and Small Towns as Percentages of London Prices.

| Group. | Index-Numbers of Prices. | | |
|-----------------------------|--------------------------|------------------|-----|
| | L. | A (including L). | B. |
| Meat and Bacon | 100 | 102½ | 105 |
| Bread and Flour | 100 | 97½ | 97½ |
| Tea | 100 | 104 | 112 |
| Sugar | 100 | 103 | 105 |
| Butter and Margarine | 100 | 102 | 104 |
| Milk | 100 | 94 | 89 |
| Eggs | 100 | 102 | 100 |
| Cheese | 100 | 107 | 109 |
| Potatoes | 100 | 100 | 101 |

with which the figures for small towns come out above the figures for large towns in the same groups for both classes does point, I venture to think, to the influence of certain common factors which are independent of class.

The subject may be pursued a stage further. In the "Report of an Enquiry by the Board of Trade into Working-Class Rents and Retail Prices in Industrial Towns of the United Kingdom in 1912," a table is given¹³ which compares by means of index-numbers the retail prices of certain commodities in a number of towns, with prices in London, Middle Zone, taken as 100. The towns are then grouped together according to population with the following result:—

TABLE XVII.

Mean Retail Price Indices, October, 1912, for Towns grouped according to Population.

| Population Group. | No of Towns included. | Means of Indices for Towns in Group. | | | | |
|--|-----------------------|--------------------------------------|-------------|-------------|------|----------------|
| | | Meat (British) | Other Food. | Total Food. | Fuel | Food and Fuel. |
| Towns with a population : (B) 14,000-50,000 ... | 24 | 97.5 | 101.9 | 100.7 | 84.3 | 98.6 |
| (A) { 50,000-100,000 ... | 23 | 96.6 | 100.3 | 99.4 | 82.3 | 97.0 |
| { 100,000-250,000 ... | 26 | 97.4 | 100.2 | 99.3 | 82.7 | 97.2 |
| { 250,000 and over ... | 14 | 95.8 | 101.1 | 99.7 | 75.0 | 96.4 |
| London { Outer Zone ... | 1 | 100 | 101 | 101 | 96 | 100 |
| (L) { Inner Zone ... | | 96 | 100 | 99 | 102 | 99 |
| { Middle Zone ... | | 100 | 100 | 100 | 100 | 100 |

Here again the differences are not large, but what is striking is the consistency with which the B figures come out higher than the A figures, and this applies to each group: meat, food, and coal. For "total food," also, the B figures are no lower than the London figures.

Another table ¹⁴ in the same volume gives the percentage changes in retail prices between October, 1905, and October, 1912, so that, by working back from the figures in Table XVII, it is possible to calculate similar indices relating to the earlier date. The result is shown in the following table, where again the B figures are consistently higher than the A figures.

TABLE XVIII.

Relative Mean Retail Price Indices, October, 1905, for Towns grouped according to Population.

| Population Group. | No. of Towns included | Means of Indices for Towns in Group. | | | | |
|--|-----------------------|--------------------------------------|-------------|-------------|-------|----------------|
| | | Meat (British) | Other Food. | Total Food. | Coal. | Food and Coal. |
| Towns with a population : (B) 14,000-50,000 ... | 24 | 99.3 | 99.1 | 99.2 | 79.4 | 97.2 |
| (A) { 50,000-100,000 ... | 23 | 98.7 | 97.3 | 97.9 | 77.2 | 95.4 |
| { 100,000-250,000 ... | 26 | 98.5 | 96.9 | 97.2 | 79.4 | 95.3 |
| { 250,000 and over ... | 14 | 98.4 | 98.9 | 98.7 | 71.0 | 95.5 |
| London { Outer Zone ... | 1 | 103 | 102 | 102 | 98 | 102 |
| (L) { Inner Zone ... | | 98 | 99 | 99 | 101 | 99 |
| { Middle Zone ... | | 100 | 100 | 100 | 100 | 100 |

I also succeeded in obtaining comparative price data for the supply of electricity and gas in large and small towns. The *Electrical Times* publishes periodical supplements containing useful tables of costs and records of Companies and Local Authorities supplying electricity. I abstracted my information from the Supplement for 1st December, 1927. For the bulk of the municipal returns the period covered was the year ending March, 31st, 1926 or 1927, while for the Companies the year ended on December 31st, 1926. In order to avoid the effects of the coal stoppage I used the municipal returns for the year ending March, 1926, only. I divided all the provincial towns for which data were available into two groups: 28 A towns, each with a population exceeding 50,000 at the 1921 Census, and 52 B towns, each with a population below that level. I then calculated for each group the arithmetic mean price

obtained, in pence per unit of electricity, from private consumers for light, power, and heat, with the following result :—

A Towns : price per unit = 2.205*d.*

B Towns : „ „ „ = 3.606*d.*

I also calculated the standard deviation for each distribution, and thence the probable error of the difference between the above prices, with the following result :—

$$\text{Difference} = 1.40*d.* \pm 0.17*d.*$$

The difference is about eight times its probable error and therefore could not have arisen through random sampling. It reflects a real difference of conditions, probably due to economies which are possible in production for a large demand. For the only four London Boroughs for which figures were given for the corresponding period the average price was 2.15*d.* per unit.

I further calculated the average fare per passenger in pence on electric trams run by Local Authorities for two similar random groups of provincial towns. For 25 *A* towns the average fare was 1.436*d.* and for 12 *B* towns it was 1.623*d.* The difference was 0.19*d.* \pm 0.08*d.*, which is in the same direction as before but is scarcely significant. In this case, however, the available information is not really adequate for our purpose : one would like to know the average fare per passenger *per mile*.

Price data of a similar character are to be found in the *Gas World Year Book*, 1927, in regard to the supply of gas. As a random sample I noted all the towns already discussed, in relation to tramways and supply of electricity, for which the charge per therm for gas was given in the *Year Book*, and I divided them as before into two groups. There were 59 such towns, 23 *A*'s and 36 *B*'s, and the mean charge per therm was—

for the *A Towns* : 9.804*d.*

„ „ *B* „ 12.056*d.*

The difference between these prices was—

$$2.25*d.* \pm 0.42*d.*,$$

again a difference too large to be explained away as due simply to random sampling.

For 13 London Gas Companies the mean price charged was 10.0*d.* per therm.

The unbiased selection of statistics we have just examined, in regard to food, coal, gas, and electricity, lends support to the suggestion that the higher expenditure in the smaller towns, revealed by the analysis of 235 family budgets, is due in part at least to the

higher cost of living in those towns, though that does not rule out the possibility of a variation also in the standard of living with size of town. Reasons have been submitted in the course of the paper to account for the likelihood of the prices of some things being higher in small towns. The cost of transport is an important factor affecting price for all commodities which have to be brought to the place of consumption from elsewhere. This obviously affects the price of coal and, in a small way, that of imported foods such as sugar, tea, and coffee. To those who are unaware of the extent to which as a nation we now import meat, butter, eggs, and cheese, it may be less obvious that it affects the prices of these commodities also. It has been estimated, by two of our leading authorities on agricultural matters, that less than 50 per cent. of any of them is home produced.¹⁵ Since goods are frequently carried by fast trains or motor-vans to large towns and important centres, whence they are distributed by slow trains or by road to the smaller and more out-of-the-way places, it follows that the cost of transport to the latter will in general exceed that to the former. Again, the small retailer, who is typical of the small town, buys in small quantities and not in bulk, with the result that he has to pay more per unit and the carriage will cost more; in addition to this, his turnover will be less rapid than that of the large dealer, so that his overhead charges all round will be higher. The price he charges over the counter will be at least enough to cover all costs and to return a reasonable profit, in the absence of sharp competition forcing price below that level. Moreover, in a small town, where all the dealers are acquainted with each other, friendly relations would be impossible if one started to cut prices in order to capture the trade of the others. The tendency would rather be towards a tacit understanding among them not to charge below a certain price. I am disposed to suggest that the keener and more prevalent competition for custom in large towns and its reaction upon prices is a factor to which sufficient importance has not been attached in comparing the cost of living with that in smaller towns and country places. Reasons such as these perhaps help to explain why the figures of expenditure disclosed in the budgets analyzed are not more obviously to the advantage of the B group of towns and to the disadvantage of the London and A group. Whatever the explanation may be, we appear to have in these budgets the 'lie direct' given to a long-cherished notion that it is in general cheaper to live in a small town than in a large one. The delusion, if it be one, may possibly have arisen in two ways: our attention is caught by the high rents and rates in the large town, which are undoubtedly a serious item, and we forget that rent, according to economic theory, is not a determining factor in the prices of other commodities;

also, many people are under the mistaken impression that the residents in small towns and country places live largely on what is produced locally.

I desire to express my grateful thanks to Miss D. M. Haigh and Mr. G. Darling, at one time students in the Liverpool School of Social Science, who made a first analysis of the Part I returns under my direction. I am also indebted to my colleague, Professor A. M. Carr-Saunders, with whom I rarely discuss any research but that I receive some new ideas.

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- ¹ *Methods of Conducting Family Budget Enquiries*. International Labour Office; Studies and Reports, Series N (Statistics), No. 9, pp. 21-2.
- ² Ditto, pp. 51-2.
- ³ *Report of the Working-classes Cost of Living Committee*, 1918. Cd. 8980, p. 13.
- ⁴ See Report under ³ above, pp. 12, 15. Also, *Memorandum on the Consumption and Cost of Food in Workmen's Families*, 1904. Cd. 2337, p. 5.
- ⁵ *Census of England and Wales, 1921*, General Report, pp. 23-4.
- ⁶ *Report of the Committee on National Debt and Taxation*, 1927. Cmd. 2800, p. 88. Also, Appendices to the Report, p. 56.
- ⁷ *The Labour Gazette*, February, 1921, pp. 69-72.
- ⁸ See Report under ³ above.
- ⁹ Price changes are published each month in the *Labour Gazette*.
- ¹⁰ "Pre-War and Post-War Taxation," *Journal of the Royal Statistical Society*, Part IV, 1927, p. 698.
- ¹¹ *The Measurement of Changes in the Cost of Living*, read before the Manchester Statistical Society, February, 1924.
- ¹² See also, for example, *Report of the Royal Commission on Food Prices*, 1925. Cmd. 2390, pp. 26, 91, 92, and Annex VII. Ministry of Agriculture, Economic Series, No. 9 (1925): *Report on the Marketing of Potatoes*, p. 8.
- ¹³ See p. xxxviii of the Report mentioned.
- ¹⁴ Ditto, p. xxxix.
- ¹⁵ *The Possibilities of British Agriculture*, Rew and Russell, p. 12.

PART ONE.

1. London, A or B? _____
2. Married or Single? _____ Years of Service? _____
3. Householder or in Rooms? _____
4. Salary (including Bonus, if any)? _____
5. Number of Dependents in the Household :—

| | NUMBER |
|--|--------|
| Adults (including Self and Children over 18)?... | _____ |
| Children (under 18)? | _____ |
| Servants (if employed throughout the week)?... | _____ |

The Budget which follows is intended to show all the expenses which have to be met by the Income stated in (4) above. Where the total expenditure exceeds total income, *i.e.* private income, etc., please state here which items of the expenditure are abnormal or how the balance is rectified :—

| Family Budget. | Annual Expenditure. Exact or Estimate. | | | | | | | |
|--|---|---------------------|-------|--|--|--|--|--|
| Rent of House or Rooms (if house is your own, give estimate of rent) | | | | | | | | |
| Rates and Taxes (including House Tax and all Local Rates) | | | | | | | | |
| Coal, Gas, and Light (Electric or other) | | | | | | | | |
| Water (if not included in Rates above) | | | | | | | | |
| Housekeeping (Food, Cleaning Materials, etc.) | | | | | | | | |
| Wages : Maid, Charwoman, Gardener, etc | | | | | | | | |
| Total Holiday Expenditure (<i>not elsewhere included</i>) | | | | | | | | |
| Lunches or other regular meals away from home | | | | | | | | |
| Clothing | | | | | | | | |
| Education :— | | | | | | | | |
| | <table border="1" style="margin: auto; border-collapse: collapse;"> <tr> <th style="width: 40%;">Number of children.</th> <th style="width: 40%;">Ages.</th> </tr> <tr> <td style="height: 1.2em;"></td> <td style="height: 1.2em;"></td> </tr> <tr> <td style="height: 1.2em;"></td> <td style="height: 1.2em;"></td> </tr> </table> | Number of children. | Ages. | | | | | |
| Number of children. | Ages. | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| Day School... | | | | | | | | |
| Boarding School | | | | | | | | |
| Doctor, Dentist, and Chemist | | | | | | | | |
| Insurance and Assurance | | | | | | | | |
| Repairs and Renewals | | | | | | | | |
| Travelling to Work | | | | | | | | |
| Other Travelling Expenses (excluding holidays) | | | | | | | | |
| Clubs and Recreation | | | | | | | | |
| Subscriptions and Charities | | | | | | | | |
| Motor-car or Motor-cycle (Insurance and Upkeep only) | | | | | | | | |
| Beverages and Tobacco | | | | | | | | |
| Papers and Stamps | | | | | | | | |
| Sundries (<i>i.e.</i> any items omitted above) | | | | | | | | |
| Total Expenditure | | | | | | | | |

(To be filled in, if possible, by the wife.)
Actual Expenditure on Food during Four Weeks, commencing 1st February, 1926.

| | Quantity. | Amount spent. | | Quantity. | Amount spent. | |
|------------------------------------|-----------|---------------|-----|--|---------------|-----|
| | | £ | d. | | £ | d. |
| Beef ... | ... | ... | ... | Haricot and Dried Beans, etc. | ... | ... |
| Mutton ... | ... | ... | ... | Eggs ... | ... | ... |
| Pork ... | ... | ... | ... | Cheese ... | ... | ... |
| Bacon and Ham ... | ... | ... | ... | Honey, Jam, and Marmalade | ... | ... |
| Sausages ... | ... | ... | ... | Syrup or Treacle ... | ... | ... |
| Tinned Meat ... | ... | ... | ... | Sugar ... | ... | ... |
| Poultry and Meats not named above | ... | ... | ... | Pickles and Sauces | ... | ... |
| Fish ... | ... | ... | ... | Condensed Milk ... | ... | ... |
| Bread ... | ... | ... | ... | Fresh Milk ... | ... | ... |
| Flour ... | ... | ... | ... | Fresh Fruits | ... | ... |
| Cake, Buns, etc. | ... | ... | ... | Tinned Fruit, etc. | ... | ... |
| Butter ... | ... | ... | ... | Potatoes ... | ... | ... |
| Margarine ... | ... | ... | ... | Fresh Vegetables ... | ... | ... |
| Biscuits ... | ... | ... | ... | Home Produce, not included above, e.g., | ... | ... |
| Lard, etc. | ... | ... | ... | Vegetables, etc. (estimated quantity and cost) | ... | ... |
| Suet ... | ... | ... | ... | Other foods bought :— | ... | ... |
| Tea ... | ... | ... | ... | | | |
| Cocoa ... | ... | ... | ... | | | |
| Coffee ... | ... | ... | ... | | | |
| Oatmeal, Rice, Sago, Tapioca, etc. | ... | ... | ... | | | |
| | | | | Total | ... | ... |

The Quantity should be stated in lbs., where possible, otherwise pints (of milk), number (of eggs), or other usual description.

The quantity and cost of any food made at home at irregular intervals, e.g., jam, etc., and consumed during the period under consideration may be estimated.

Home-made Cakes, etc., will presumably be covered by including the expenditure on their ingredients under other headings (e.g., flour and butter).

DISCUSSION ON MR. CARADOG JONES'S PAPER.

MISS COLLET: I have much pleasure in moving a Vote of Thanks to Mr. Jones for his most interesting paper, and also in expressing appreciation of the way in which he has extracted from his material every ounce that he legitimately could, and nothing more.

With regard to the percentage of returns that he succeeded in obtaining, the number in itself might be regarded as high. A 10 per cent. percentage of returns might be very representative; it all depends upon whether the people who make the return are representative.

Any remarks that I have to make are directed entirely to future work that Mr. Jones will give us, and are not really a criticism of things in this paper. The best is very frequently the enemy of the good, and if we demand perfection in returns we shall get either none or false returns. I think that Mr. Jones was wise in not pressing for anything that his Committee objected to putting in the questions; in all probability they knew that such questions would not be answered.

If you look at the expenditure, you will notice that nearly half—probably more—is expenditure paid out by women, and for the most part it is expenditure that has to come under the head of petty cash. It is very laborious work—almost impossible for anybody who does not take it up as a serious burden in life—to keep accounts of their expenditure of petty cash regularly, especially when one knows it is not of any help whatever in housekeeping. Also there are certain items which are more difficult to record than others, and it would be just as well in the future if everybody abandoned the attempt to get housewives to enter the quantities that they buy. The Domestic Economy Schools can give fifty ways of spending the money. I notice that Mr. Jones abandoned—as everyone does—the attempt to use the returns of quantities sent in. It is of no importance to know how many pounds of peas in their pods the housewives bought. Anything that makes the work easier makes it possible to get a larger number of returns.

In collecting women's returns, one of the most important things, apart from their fear that the return is required in order to make them spend their money better, is that they should see what use it all is. In learned societies there is a tendency to be very happy when one can see a beautiful curve growing up, showing that everything is the same everywhere. What the women want is the exact opposite; they want to break up the curves and find out the results of particular variations.

When I first read Mr. Jones's paper I merely felt how interesting it was, but as I had to make remarks upon it, I asked myself what I should have wished to know with the same materials before me.

The first thing would have been to record them in groups of households with resident servants, non-resident servants or no servants at all. Those three would have been the groupings in which I should have been interested. We need to break up that 44 per cent. (London, Q₁) and see what happens with the families free from the burden of an inmate spending her leisure time unhappily in their house. I noticed that in the paper we had not any information given us about domestic servants' wages as apart from expenditure on food. That suggested to me that probably not a sufficient number of people gave information about domestic servants' wages for Mr. Jones to separate them, but there is an enormous difference in the way in which households are run in this respect, and the effect on food consumption, according to whether servants are resident or non-resident, is very great indeed.

The next thing I should have wanted to know was the number of children in each group. The questions asked did not exactly invite people to give particulars of the ages of the children; it was left rather vague. I should myself have wished to know the size of the family, the number of infants under six, children under fourteen, young persons under eighteen, and adults, and I should not have worried about sex at all. In families I think you will find that appetites vary quite regardless of any rules that may be made. This is one point I should like to criticize not only in Mr. Jones's paper, but in general. Everybody now uses standard dietary units in terms of adult males. If you are rationing a nation, or an army, or an institution, it is, of course, absolutely necessary to reduce a population to standard dietary units, and it is necessary to assign to this standard dietary unit a standard dietary scale. Even if it is not correct, it is better to have a rule and abide by it, especially when the standard is so high that it gives everybody more than the great majority have been able to buy before. But I think there is a great deal of error introduced when you express families in units of adult males. It would be quite as correct, and less misleading, to express it in terms of infants under six years of age. According to the Lusk scale the consumption of the infant under six is 50 per cent. of the man's. But quite a number of people, if given this standard unit for a man, believe that it is a real man, and real unit of consumption derived from practical experience. It is not anything of the kind; the units are arrived at in different ways, but, generally speaking, an expert in dietetics compiles a scale calculated to produce the qualities necessary for the ideal man that the expert in dietetics has in mind. It is not a real person at all. Then I suppose they work out the same kind of scale in proportion for the women and children. I do not know how it is arrived at, but it is an imaginary conception bringing in all sorts of absurd calculations as soon as it gets into the hands of the man in the street.

As an example of different expression I should like to quote from an unpublished diary of 150 years ago, an analysis of one year's expenditure of a household. The year was 1777, and the total expenditure was £112 4s. 1d., and I believe that would come some-

where between the first and second quintiles at present-day prices.

| | £ | s. | d. |
|--|----|----|----|
| Rent | 15 | 0 | 0 |
| "House expenses" (which would include fuel and light, repairs, etc.) | 17 | 1 | 4 |
| Housekeeping ... | 48 | 2 | 10 |
| Servant's wages | 1 | 16 | 0 |
| Mrs. B.'s clothes | 9 | 8 | 4 |
| Mr. B.'s clothes | 10 | 5 | 0 |
| Liquors | 9 | 10 | |
| "Disbursements" | 10 | 0 | 9 |

Instead of thinking of that family as comprising 3·28 dietary units, I note that it included a husband and wife, a young nursemaid, a child who was two in July and a baby born at the end of September. To think of that kind of family in terms of men will invariably lead people wrong.

As to the amount spent on liquors, I think that Mr. B. probably charged a good deal of his consumption of alcohol to "Business expenses" and did not put it into the domestic budget. The amount for "disbursements," £10 os. 9d., which had to cover everything not otherwise mentioned, brings me to the most important point to remember, that as soon as we get to the middle-class budgets, it is no use imagining that we can guess what they mean or that we have any kind of representation of the facts from mere figures. The return must be got from people who are not ashamed to write an account of the whole thing—people who are thoroughly interested in it for its own sake. Could one possibly tell from "disbursements" the state of a family where there were twelve children born within twenty years, and nine of them buried? There is all the difference in the world according to whether you have simply a maidservant and no children; a maidservant and two children; or grown-up children with no maid. The return must be made by intensive methods, and members of the Statistical Society might give the lead and keep a record not only for one year, but for several. Five per cent. of the members of the Statistical Society would be about fifty, and if each wrote his own budget, covering a period of five years, and then asked Mr. Jones to edit it for publication, the result would be a really valuable historical document. I lay great stress upon the value of records for the future. After all, history is of interest to most people.

As to the expenditure in small towns, in a book on Italian Home Life written at the end of the last century, the author said that everything was cheaper in England than in Italy, but living was much more expensive; and we know that people of small incomes do not spend more because price rises; they buy less, and sometimes go without altogether.

I am convinced that I do know why the expenditure is higher in the small towns than elsewhere. It is that the same income in a small town puts a man in a higher social level, and the family spends more in social life, whereas in London it is possible to go wherever one likes and to be economical if so desired. In a small town, especially

if the husband's position has to be remembered, the family spends more on almost everything. Personally I think that is the real explanation.

MR. HILTON: I am glad to have the opportunity of seconding the Vote of Thanks to Mr. Caradog Jones for his paper. It is just the sort of paper the Society ought to hear, and ought to ponder. Its value, to the Society and to the outside world, consists not so much in its conclusions as in its lucid account of the enquiry that was made, in its clear survey of the material employed, and in the careful thought Mr. Jones is shown to have given to the whole matter. The paper will be most helpful to those who may subsequently come to conduct other enquiries of the same kind into the distribution of expenditure among any section of the community.

I will not elaborate upon the good qualities of the paper: to treat them as they deserve would take more than the time allowed. Nor will I follow up what Miss Collet has said concerning the budget form, for Miss Collet speaks with special knowledge on that subject, and I found myself drawn into ready agreement with her. I will devote myself to one or two features of the paper which I think are either questionable or erroneous.

One item I wish to question is the use of quintile instead of the usual quartile dispersion. The quintile has its superiorities, but are they so great as to outweigh, in this case, comparability with all other data, past and future, on the same subject? Or does Mr. Jones think the time has come for a permanent change-over from quartile to quintile dispersion of family expenditures? What we have always to ponder, in this workaday world, is the reconciling of our desire for distinctive and perhaps improved presentation with the desirability of keeping our results comparable with the results of other similar enquiries. If Mr. Jones thinks it is time to change over to the quintile I should like to know more of his reasons for holding that view. If he is merely indulging a personal fancy which others will disregard, it is clear that we shall have trouble in comparing Mr. Jones's quintiles with other people's quartiles, and I offer the suggestion that Mr. Jones should re-work his calculations in quartiles as well as quintiles, and either publish them as an addendum to his paper or at least keep them handy for those who may want them in the future.

Now a point of warning. In Table II, p. 468, there are some figures which are apt to strike the uncareful reader as startling. The table shows a relationship between expenditure and size of family, and comes dangerously near demonstrating that a large family goes with a large income and that the poorer families have the fewer children. The text makes it clear that "family" includes servants and other dependents, which puts quite another face on the matter, and I agree with Mr. Jones that "household" would be less liable to misunderstanding in his headings and text than "family."

My next point is one not of presentation but of substance. On p. 486 Mr. Jones says: "The 1s. a week allotted (by the Ministry of

Labour) to 'Other Items' would scarcely suffice even in 1914 to cover insurance as well as other expenditure which does not fall under any of the four main heads"; and he follows that up by giving, on p. 487, a table which has two groups of figures—the upper group being the distribution of Food, Rent, Clothing, and Fuel and Light, according to various family budget enquiries, and the lower group being the distribution when an allowance is made for other miscellaneous items. Mr. Jones jumps to the conclusion that the Ministry of Labour has not allowed enough for "Other Items" and that its budget is out of step in this respect with all the other budgets. I make bold to say that is a misapprehension on Mr. Jones's part. The Ministry of Labour's figure for these other items is much more than one shilling pre-war and, even so, refers only to such items as are included in the monthly statement of the changes in the cost of living of the working classes. It does not pretend to include the total miscellaneous expenditure of a working-class family. It will be obvious to everyone, that if you are framing a basis for a monthly index-number, in which it is required that you shall collect your prices on the first of the month, and issue your national figure all complete on the 16th of the month, you must take only a selection of the more important of the miscellaneous items. You must disregard canary seed, cough-drops, hair cuts, picture postcards, and a thousand other small and occasional expenditures: that is, you must disregard them in making your monthly price enquiries. You simply cannot follow the changes in the price of such things for use with a monthly index-number; but that does not mean that you deny their existence as items in working-class expenditure. You must of necessity take things of which the consumption is more or less even and ascertainable; therefore, for every good reason, theoretical and practical, you make a selection of the miscellaneous items. That selection as taken by the Ministry of Labour was accorded a weight of one-half in a total weight of $12\frac{1}{2}$. That 4 per cent. does not pretend at all to cover the whole range of miscellaneous expenditure; it merely means that the items selected for a particular purpose are 4 per cent. of all the items used for that purpose. The "Other Items" group used by the Ministry of Labour in its monthly Cost of Living figures has not the same content as the "All Other Items" group of other budgets and is not comparable with them. The Ministry of Labour could, of course, give a weight of 1 or $1\frac{1}{2}$ or 2 to its "Other Items"; but to do this would be to assume that the price movements of the unmeasured "other items" were similar to those of the measured items. There is no justification for such a course. The Ministry of Labour weights are correct for their purpose. This is borne out by the upper half of Table XII. The lower half of Table XII reduces to what appear to be comparable percentages things that are not comparable.

My sole remaining point was touched upon by Miss Collet. I also, in common with Miss Collet, challenge the final deduction of the paper: "Whatever the explanation may be, we appear to have in these budgets the 'lie direct' given to a long-cherished notion that

it is in general cheaper to live in a small town than in a large one." I respectfully suggest to Mr. Jones that the material presented in the paper demonstrates nothing of the kind. But in saying that perhaps I am reading the phrase "cheaper to live" in a sense different from that meant by Mr. Jones. By "cost of living" in one place as compared with another I personally mean the cost of obtaining the same measure and quality of goods and services in one place and in another. Does Mr. Jones tell us anything about that? No. All that he gives us here is a series of figures to show that his budgeteers of the smaller towns *spent more* than those in the larger towns. That really is not the same thing as the cost of living being higher in the smaller towns. An argument of sorts can be put up for the view that it is much the same. It may be said that if the village rector smokes twice as much as the town rector, it must be concluded that village existence is twice as conducive to smoking as town existence and therefore that the "cost of smoking" in the country is twice as high as in the town. Maybe, but that does not mean that the price of tobacco is twice as high in the country as it is in the town, and that is what Mr. Jones is really trying to measure. Mr. Jones has confused rate of expenditure with "cost of living"—in its familiar sense.

Observe the figures in Table IV. The small-town people spent proportionately more on alcohol and tobacco than the large-town people. Is that really proof that alcohol and tobacco are dearer in small towns than in large? Of course it is not. It happens to be common knowledge that alcohol and tobacco are not dearer in small towns than in large. All that the figures prove is precisely what they state; that these particular budgeteers in these particular small towns spent more on alcohol and tobacco than other particular budgeteers in larger towns. "Holidays, Clubs, and Recreations" is another item in which the small-town dweller appears as having spent more than the large. Again, that cannot possibly be interpreted as meaning that such goods cost more in small towns than in large. Again, subscriptions and charities are heavier items among the small-town dwellers than among the others. Can that be taken to mean that one gets less subscriptional and charitable value for money in a small town than in a large? The concept itself is meaningless. This is an item that does not belong to the realm of measurement of local differences in the cost of obtaining a given measure and kind of the necessities and conveniences of life.

Of far greater moment are the figures in Table XVI, for these are based on a much wider range of data than the figures in Mr. Jones's budgets. The only moral of this table is that food prices, as a whole, are the same for London, for large towns and for small towns. The difference in the table of 1 per cent. between the large and small towns is a measure of the closeness to complete identity—not a measure of disparity. What makes differences in the cost of living as between place and place is, generally speaking, not food at all, but dwelling and the cost of travelling to work. Mr. Jones is clearly wrong in the inferences he draws from his food data; and as to rents and fares to and from work, neither he nor anyone else, so

far as I know, has up-to-date information on which safe calculations could be based. I therefore dissent entirely from the view that "in these budgets we have the 'lie direct' given to a long-cherished notion that it is in general cheaper to live in a small town than in a large one." The budgets assembled and analysed by Mr. Jones do not prove either that or anything else as to local differentiations in the "cost of living" as commonly understood. I would go further and say that information collected by way of family budgets cannot be made to establish such differences; except it be followed by a widespread enquiry as to the local prices of identical goods or services made, in the case of food and all other "counter goods," not of the householder, but of shopkeepers.

As I have said, the importance, to me, of Mr. Jones's paper lies not in its conclusions, but in the thought and care given to the assembling and treating of the material. I have very great pleasure in seconding the vote of thanks.

Mr. F. J. MARQUIS expressed his thanks to Mr. Caradog Jones for the paper he had just read. He stated that when he first read the paper he had some doubt as to the statistical value of conclusions based upon such a small section of the population. He was a little concerned at the very wide range of towns included under Class A. Whilst some homogeneity might be expected among Class B towns with a population of under 50,000, Class A, embracing towns that were over 50,000 but were not equal to London, represented an extraordinarily wide diversity of population, and considering that there were only 62 returns from this wide range, conclusions based upon them gave openings for considerable possibility of error.

In spite of this criticism, the speaker admitted that the various tables of statistics seemed, in their results, to justify Mr. Caradog Jones in his classification, but had the number of returns been larger, or the population of the towns from which they were obtained less diversified, his conclusions would surely have been fortified.

Mr. Marquis proceeded to point out the practical interest of Table IV, in which the figures showed that there was very little correlation between rates and rents on the one hand and the cost of food and clothing on the other. He suggested that these figures ought to have some interest to politicians, in view of recent legislative proposals.

In the final conclusion of the paper, Mr. Caradog Jones had obviously raised a point of very considerable practical importance, and whilst Mr. Marquis did not pretend to have the same statistical ability as the mover and seconder of the resolution of thanks, who found themselves in disagreement with the author's conclusions, he himself had been convinced by them. It was a conviction that arose partly from a survey of the statistical evidence that Mr. Caradog Jones had put forward, and partly from the fact that, having some knowledge of the distributive trades of this country, it was a conclusion at which he would have expected a statistician to arrive.

The cost of living was very largely determined by the efficiency

of distribution, and only to a very small extent by the comparative nearness of the source of supply of a product to the consumer. Since the distributive trades were only organized on any scientific basis in the very large centres of population, it was only to be expected that the people living in places with under 50,000 population would be paying dearly for most of their supplies of food and clothing.

The seconder of the resolution, in seeking to controvert Mr. Caradog Jones's conclusions, by comparing the cost to the village rector and to a man in London of smoking tobacco, was clearly being humorous, as he must be quite well aware that since the costs of almost all forms of smoking were most adequately controlled by the large tobacco companies, this did not afford any basis for comparison.

If it be true, as the speaker believed, and as Mr. Caradog Jones had concluded on the last page of his paper, that the cost of living in these small towns, where so little is done by way of public and social service, was almost as high as in the city of London, then Mr. Caradog Jones had opened out the prospect of a most interesting enquiry into the conditions and the costs of the distributive trades of this country, which, in the opinion of the speaker, except in London and the principal provincial cities of the country, were in a very elementary state of organization.

DR. BRADFORD HILL said that Mr. Caradog Jones had given them so much interesting information that he was rather nervous of asking for more; he felt doubly nervous as the little more that he wanted made him quarrel with Miss Collet. Miss Collet had summarily dismissed as useless material the quantities of food returned in Part 2 of the schedule. Dr. Hill rather thought these quantities were of acute interest, not only to the physiologist, but also to the social worker. Knowledge of the nutritional level of the population was still very meagre. The importance of such knowledge was very obvious in the war, when the Food Committee of the Royal Society was called upon to advise the Ministry of Food as to the basis upon which to place the rationing scheme. Their knowledge on this subject had been increased since then, but it was still scanty; it had been increased mainly by diet studies derived from the working-class population. Such studies related to manual workers only. Mr. Caradog Jones seemed here to have data bearing on the diet consumed by the more sedentary type of worker, and possibly Mr. Crump's studies might supply additional evidence. It would be interesting to have some information as to the changes in quantity and type of food which went with the change of income and difference of occupation. Some indication of the type of change was given in Table XIII on p. 489, where Mr. Caradog Jones showed that with people of higher incomes, 37 per cent. of the food expenditure went on meat as against 12 per cent. on bread, whereas in the working classes meat fell to 31.5 and bread went up to 19 per cent.

Dr. Hill said that in some diet studies he had made in Essex of the families of agricultural labourers, he found that 69 per cent. of

the income was devoted to food, and nearly one-third of that had to go on bread alone. He thought it would be of real value if Mr. Jones could translate Table XIII into the amounts of food purchased (in relation to the size of family) and convert these amounts into food values—carbohydrates, fats, proteins and calories consumed per man value.

Referring to the accuracy of the returns, Mr. Caradog Jones had shown that he had two columns in Part I of his schedule, one for exact replies and one for estimates. Dr. Hill wondered whether there were any differences shown between small and large towns in the ratio of number of estimates to exact replies. For instance, if one turned to Table IV on p. 471, there was a suggestion of the estimates coming under such headings as "Doctor, Dentist and Chemist," and perhaps "Alcohol and Tobacco," where most of the figures ended in a nought or a five. He asked whether the higher consumption of tobacco and alcohol in small towns, which Mr. Caradog Jones ingeniously explained by saying that the abler members, whose very ability enabled them to resist these little weaknesses, tended to migrate to large towns, might not also mean that these abler members in the large towns were able to give more exact returns, and that the less able in the smaller towns relied more upon estimates which, in this particular case, erred upon the side of excess.

MR. L. R. CONNOR said he desired to join with the proposer and second of the Vote of Thanks in expressing high appreciation of Mr. Caradog Jones's paper. This was, to his knowledge, the first published paper that dealt specifically with the question of middle-class budgets in this country, and for that reason it was of first-class importance. Comparatively speaking, the ordinary working man's budget was a simple proposition, for there was no delicate distinction between capital and income; all that needed to be done was to make the weekly budget balance. With the middle-class man the case was different—various difficult questions came in. For example, what was he to do with articles bought on the instalment system, or the purchase of a house through a building society? It would be useful if Mr. Caradog Jones would indicate the general lines taken up in this enquiry with regard to such items.

Mr. Connor said he would like to draw attention to p. 182. When Mr. Jones had his paper in draft and it had been actually approved by the Council, the fact came to his knowledge, and he was able to put Mr. Jones in touch with Mr. Archer, of the Association of His Majesty's Inspectors of Taxes, through whose kindness certain figures collected in the year 1922 with regard to the budgets of higher Civil servants had been released. It would be noticed that the two sets of figures on p. 484 showed a remarkable amount of agreement, and seeing that the two enquiries were conducted quite independently and only at the last moment were the results put together, it might be inferred that faith could be placed on these small samples, and that they could be taken as applying to a much larger field of enquiry than the actual field from which they were drawn.

Towards the end of the paper Mr. Caradog Jones had raised the question of the cost of living for the middle classes. The Ministry of Labour cost-of-living figure was issued with a warning that it was only applicable to the expenditure of the urban working man, but one found in practice that this figure was often used for rather wider purposes. It was actually used as a basis for varying the bonus to Civil servants and people in a similar position, and it was frequently quoted by economists and others as a measure of retail prices or of the cost of commodities in general to the consumer. If the weights of the middle-class budget were compared with the well-known weights of the Ministry of Labour, it would seem fairly obvious that the increase in the cost-of-living figure of the middle-class man must be something substantially different from that of the working-class man, the reason being that the former spent a smaller proportion of his income upon food, which was comparatively speaking a cheap item, but decidedly more on services. As far as the Ministry of Labour cost-of-living figure was concerned, services did not enter—at all events, directly. The cost of services at the present time stood at something like 95 per cent. above pre-war level, and in so far as any family made use of the services of other people, their expenditure tended to get increased.

Another point which seemed to affect the question was that the Ministry of Labour figure for rent only included controlled rent (51 per cent. above pre-war level). He understood that enquiries had been made why this was so, and that the Ministry's reply was that they had no information, but contemplated enquiries. Mr. Connor doubted that the majority of the working classes were in controlled houses; he would have thought the experience of most people was in the other direction. Whatever the truth was in their case, it was emphatically true that the middle classes were not living to a large extent in controlled houses, and if the present position of middle-class men as regards rent were compared with that of 1914, an increase of something between 51 and 100 per cent. would be noticeable; 75 per cent. would probably be a fair figure. It must be remembered that numbers of middle-class people were now buying houses through building societies at prices which probably represented an advance of 100 per cent. above pre-war level.

Taking these facts into consideration, it was clear that the proper index-number for the middle classes was not the 65 per cent. of the Ministry of Labour, but something considerably higher.

A further point to be considered in dealing with middle-class expenditure was that the middle-class man was tied up, to a greater extent than the working-class man, by long-term contracts. If he took a house, or if he sent his children to school, there was an obligation to pay out for a considerable period. If he engaged a domestic servant he did not feel himself at liberty to cut her wages. This element entered into the problem in a great many ways, and therefore it would be right to say that the working-class cost-of-living figure was not applicable to the middle classes, but that probably one should make an addition of some five or ten points.

MR. NORMAN CRUMP said that in the first place he wanted Mr. Caradog Jones to take it for granted that he congratulated him on the work he had done. It was work that, on a smaller scale, Mr. Crump had himself attempted to do, but unfortunately he had neither the time nor opportunity to carry it through. However, it had fallen into abler hands.

Mr. Crump said he would like to endorse Mr. Jones's use of the median as opposed to any other type, with the proviso that a limited number of budgets was being dealt with. If one attempted to cover the whole country month by month, work on those lines would be impossible.

Mr. Crump wanted to take up the point raised by Mr. Hilton on the question of weights. Mr. Hilton's point, he gathered, was that it was impossible to collect price data every month for more than a very limited and simple set of miscellaneous items of working-class expenditure. With that there must, of course, be general agreement, and he, the speaker, was glad to have Mr. Hilton's assurance that the list used by the Ministry was far from complete. But he could not agree with Mr. Hilton that because for practical reasons it was necessary to restrict the sample of miscellaneous items, it was necessary to reduce their total weight. If an examination of family budgets showed that the true weight was about 10, he thought that weight should be employed even though the actual sample obtainable corresponded only to a weight of 4.

But in reply to both parties, he would like to take up the whole abstract question of weighting, so that he could have the exquisite pleasure of pitching a large bomb which would explode partly under Mr. Hilton, partly under Mr. Caradog Jones, and wholly under Mr. Connor. In his investigation in early 1927 he went into this question of weights very carefully. He first employed an elaborate system of cross weighting between pre- and post-war expenditure; then he confined himself to a single set of weights, then switched on to the Ministry of Labour weights and, finally, he employed absolutely equal weights. He worked out the index figures in each case from his own price data, and all four figures came within five points of each other. That was why he was a little sorry to see no reference in the paper to relative prices, because in calculations of this kind he thought that this general rule could be laid down:—(Get the prices right and the weights will look after themselves.

That brought him to his main criticism of the paper. This was the complete omission of any reference to the relative *time* changes in middle-class and working-class prices. The important point to remember was the practical object of any cost-of-living index-number, and it could not be gainsaid that the main object was to make corrections from time to time in wages and salaries to conform to time changes in the cost of living. His own investigation on behalf of the Guild of Post Office Sorters had that object in view. He was asked to show that the official "working-class" index was too low, and Mr. Caradog Jones's paper would no doubt be scanned with the same object. In point of fact he, Mr. Crump, did find that the official

figure was "too low," and he further found that this was entirely due to differences between the Ministry's price data and that supplied to him by the Sorters. It was a great pity that Mr. Caradog Jones had not been able to include similar pre-war and post-war price data in his paper, to show whether or not he would agree that middle-class prices had risen more than working-class prices.

Of course, he realized that one great difficulty was the inadequate price data relating to 1914 obtainable to-day. The man who in 1914 was a bachelor living in rooms and employed as a junior, now had a house of his own, a wife and family, and held a more senior position. In short, his whole outlook on and style of life was different, and that alone made it difficult to get from him reliable pre-war price data. It incidentally raised the question as to how far an index figure based upon 1914 meant anything at all, but here Mr. Crump, having thrown one bomb, thought he had better pause before he sat down on another.

He might add one or two points which might help those who undertook a similar investigation in the future. First and foremost, the final result must command the confidence of its victims, and for that reason, if only a small number of budgets were being dealt with, he should encourage the inclusion of everything their compilers wished to include—even down to grand pianos. He need not add that the last—and unlikeliest—item, far from raising the final index figure, might aid in depressing it! Secondly, he found it necessary to adopt varying time units for different groups. Thus, for food, he sought the expenditure for a week; for rent and fuel, the quarter was the obvious period; while for clothing and miscellaneous items, which in his case included replacements and renewals, holidays and school fees, he had to use as big a unit as a year. The collection of data in this way got over the difficulty of expenditure recurrent at long and uneven intervals, and solved many of the doubts and troubles of the people providing the data. When calculating the index figure these varying time units would easily be reduced to a common denominator.

In conclusion, though he, Mr. Crump, had perhaps laid some emphasis upon one or two points of criticism, he hoped Mr. Jones would not think he had underrated his paper. Mr. Jones had laid an invaluable foundation for all future work in this field. The fact that he, the speaker, wanted a lot more was meant really as a testimony to the value of what Mr. Jones had already given him.

MR. ARCHER said that he wished first of all to express his own thanks, and those of the other Civil servants present, to the Society for the very kind opportunity given to them of hearing the interesting and instructive paper read by Mr. Caradog Jones. Both the paper and the subsequent discussion had covered a great deal of ground, and had dealt with points in which the Civil Service was very keenly interested. The big question attempted by the paper—whether the cost of living was higher in London or outside—was a matter that touched certain classes of Civil servants very closely, as also did the

question of the relation between the middle-class and the working-class cost of living.

In view of the time, Mr. Archer could not attempt any critical observations on these points, but would content himself with repeating his thanks for the most enjoyable evening.

THE CHAIRMAN said that the only personal criticism he had to make was due to a very important letter that had appeared in *The Times* that morning on the subject of safety razors that, he would imagine, would very much disturb some of the calculations given in the paper.

The Chairman now put the Vote of Thanks to the meeting, and invited Mr. Caradog Jones to reply.

The Vote of Thanks was carried unanimously.

MR. CARADOG JONES, replying, said : There is no time for me to deal with all the points mentioned in the discussion.

Miss Collet suggested that it might have been more useful to classify the budgets with an eye to the amount of domestic service in different families and the ages of the children. It would have been possible to divide my budgets, though not very satisfactorily, on those lines ; I do not know what the result would have been, as I did not choose that particular method.

With regard to the Lusk scale : I adopted that scale in order that my figures might be comparable with those of the Summer Committee, on which my Part 2, dealing with food, was modelled. Miss Collet feared that it might cause the man in the street to be led astray ; surely she was a little optimistic in thinking that the paper would get into the hands of the man in the street !

Mr. Hilton raised the question as to why I used the quintile instead of the quartile. I was dealing with people with such a large range of incomes that I thought it was desirable to get as wide a view as possible of all the different families, and the quintiles certainly do tell us rather more of their distribution in various ways than do the quartiles. Also I thought that a comparison of the quintiles that were nearest to the median with the median, would give some idea as to how far my results were consistent.

Reference was made to a small point, that I used the word " family " instead of " household " in Table II and the text ; that is true. I saw that it would have been better to use the latter word when my paper was in type, but it seemed rather a business to make the change throughout the paper. Special attention having been drawn to it in this way, it should not cause confusion.

Passing on to Table XII, which Mr. Hilton criticized, I was not guilty of any misapprehension as to the contents of the Miscellaneous group in that table (as I think the paragraph after the one from which Mr. Hilton quoted shows). I introduced the top part of the table precisely because, as I was careful to explain, the second part of the table was to some extent fallacious.

I fully appreciate the necessity for limiting the list of miscellaneous

items when making a study of the variation in prices from month to month, but in discussing expenditure as a whole—and weights derived therefrom—it is possible to take certain broad groups, as I did, and to lump the rest together under a miscellaneous heading.

Both Miss Collet and Mr. Hilton gave reasons for thinking that living is not cheaper in large towns than in small. All I can reply is that, with equal respect for them, I do not entirely agree. So far as the experience of my sample of households goes, the evidence seems to point to the conclusion that living is cheaper—*i.e.* the prices of many commodities are lower—in large towns than in small. Of course this does not rule out a difference also in the standard of living, as I pointed out in the paper. I am interested in the point of view of my critics, but I am not convinced, and I do not think they dealt at all adequately with the detailed evidence I produced in support of my conclusion. I was glad to have Mr. Marquis's support for that conclusion, as he speaks with a considerable amount of authority as one of the directors of a well-known firm.

Mr. Marquis suggested that there might be a possible opening for error by treating as one group all the towns in Class A with a rather wide range of population. The reply is that, even if the particulars had been available for a further subdivision, where the total number of budgets is comparatively small, if you divide the material too finely, you get very small numbers under different heads.

Dr. Bradford Hill, I was glad to note, pointed out how important it is that one should get more evidence as to the quantities of food consumed by different classes, though I doubt whether my own material was sufficiently detailed to lead to any important conclusions as to the difference between middle-class and working-class consumption.

Mr. Connor raised the question as to how I dealt with things bought on the instalment plan. A simple example will illustrate the method of treatment. Take people who buy houses: the principle upon which I went was this:—I ignored any money spent in paying off the mortgage on a house and simply took into consideration the estimated rent.

Mr. Crump laid down the rule that in getting information as to changes in the cost of living, the important thing is to get the prices right and the weights will look after themselves. That point I also endeavoured to stress in my paper. He would have liked me to have dealt with relative time changes in middle-class and working-class prices. That I was unable to do; I had no material in my budgets relating to pre-war prices.

Mr. Crump himself seemed surprised that when he used equal weights and different weights for his commodity groups, the results only differed by 5 points. [Mr. Crump here interposed that he was not in the least surprised.] I do not think any statistician would be surprised; that is the natural result one would expect.

I do not think I need say any more, excepting that I am very much obliged for the kind way in which you have received my paper.

Subsequently to the meeting the following additional statement was received from Mr. Caradog Jones :—

I should agree with Miss Collet as to the great value of a collection and publication of budgets on the intensive principle, where you have a complete account of the composition and expenditure of each family, but I would suggest that if you are to deal with budgets statistically you are bound to attempt some kind of group classification and to adopt certain standards of consumption for the sake of comparability, even if you sacrifice in so doing the clear picture of the make-up and spending experience of the individual family. The two methods of attack are quite different, and it is a mistake to criticize the statistical method because, while possessing certain advantages of its own, it lacks some of those which are characteristic of the intensive method.

It is obvious that to make a comparison with any real meaning between the cost of living in two different places, one must assume the same standard of living in both, although, as Miss Collet pointed out, a family moving from one to the other would almost inevitably adopt a somewhat different standard. In that sense of the term, then, any difference in the cost of living between two places resolves itself into a difference in prices. Now it is perfectly true, as Mr. Hilton said, that my budget tables only gave figures as to expenditure, not prices, but he is in error in supposing, therefore, that there was confusion in my mind between the two things. That should have been perfectly clear, I think, from the whole trend of my argument on p. 491. My contention briefly was this: Whereas some part of the higher expenditure in the smaller towns revealed in the budgets was no doubt due to a difference in the standard of living, an important part was due to higher prices charged in the smaller towns. But I wish also to make quite clear, what I think was not clear in the paper, that when I ventured to suggest, perhaps somewhat forcibly, that the budgets cast some doubt on the notion that it is in general cheaper to live in a small town than in a large one, I was thinking of the A and B towns, not of London. What may be true in general need not be true in every particular instance, and London may quite well be an exception to the rule, if there be such a rule. The figures in Table III point, in fact, to such a probability. Further, I certainly did not intend the inference to be drawn that I imagined everything including alcohol, tobacco, and charity—to be dearer in the small town. My comments on Table IV contradict such an implication. Nevertheless, I gave reasons for thinking that some things could be bought in large towns, and even in London, for less than in small towns. That ground I need not traverse again, but, as Mr. Hilton disputed this conclusion in regard to food, I may be permitted perhaps to add one example to reinforce it. I have used it before, though not in this paper. According to the Royal Commission on Food Prices, 1925, five-sixths of the meat consumed in London is imported from abroad; the proportion in country districts is much less. The competition between foreign meat and home supplies in London

will surely help to lower prices there. The bulk of our imported meat is shipped to London, though a fair proportion goes to Liverpool. It will not keep indefinitely and it takes longer to reach small places some distance from the port of arrival. These considerations result in higher prices in the smaller places. Salesmen are expected to get London prices plus the cost of transport and handling. Again, we are told that butchers in large towns, where competition is keen, lower their prices periodically to attract fresh customers, then raise them again. The careful housewife can take advantage of such practices. Also, the controller of the big business, just because he can buy cheaply, can afford to charge low prices, going in for small profits and quick returns. It is reasons such as these which, I submit, favour London and the large towns.

Though I have put forward certain definite figures and arguments in respect to price differences, it is only fair to say that I regard them as little more than hints on a matter which came up incidentally in the analysis of the budgets. I recognize that Mr. Hilton speaks with exceptional authority upon the subject, and I am sure that he, like myself, would agree that it is one which deserves to be attacked directly. The discussion which my purely tentative but apparently unorthodox conclusions have provoked will be all to the good if it leads to further enquiry on better lines.

As a result of the ballot taken during the meeting, the candidates named below were elected Fellows of the Society:—

Christian Augustine Everard Greene.
Charles Eustace Rooke.

SOME FURTHER ENQUIRIES BY SAMPLE.

By JOHN HILTON.

(Director of Statistics, Ministry of Labour).

[Read before the Royal Statistical Society, June 19, 1928, the Ex-President,
MR. G. UDNY YULE, C.B.E., F.R.S., in the Chair.]

ALMOST four years ago to the day—on June 17, 1924, to be exact—I had the privilege of reading to the Society a paper on the subject of certain enquiries conducted by the Ministry of Labour on a sample basis. The enquiries were concerned with the personal circumstances and industrial and insurance history of unemployed persons who were claimants to unemployment benefit. The sample taken for the first of these enquiries appears, in the light of later experiments, a tentative and even timorous one. It was a sample of one in every three claimants. The second enquiry was, statistically speaking, a little more venturesome. It was based on one in every ten claimants. In the third enquiry a long step was taken in the sample method and only one case in approximately a hundred was taken for investigation. The paper set out to show that the data obtained by using a one per cent. sample disclosed very much the same main characteristics as the far more unwieldy data obtained from the larger samples, that the smaller sample allowed much more detailed information upon the particular features of the individual case to be collected and analysed, and that there resulted a very considerable saving in the economy and time of prosecuting the enquiry and presenting its results.

In the succeeding four years four other enquiries into the circumstances of various categories of persons insured against unemployment have been made. In November, 1924, an investigation of the personal circumstances and the industrial and insurance history of one per cent. of the then claimants to unemployment benefit, designed to be a repetition with improvements of the 1923 enquiry, was carried out.* In June–July, 1925, a ten per cent. sample of juveniles registered for employment was examined and reported upon.† In

* Report on the Personal Circumstances and Industrial History of one per cent. of Claimants to Unemployment Benefit. H.M.S.O. Price 4s. net.

† Report on an Enquiry into the Personal Circumstances and Industrial History of 3,331 boys and 2,701 girls registered at Employment Exchanges and Juvenile Employment Bureaux—June–July, 1925. H.M.S.O. Price 1s. 9d. net.

April, 1926, an enquiry was made into a still smaller proportion, 1 in 218, of all insured persons, employed and unemployed; * and in April, 1927, a third "one per cent." enquiry into the circumstances of all claimants to benefit, on the lines of the previous two, but introducing many new features, was made. It is the purpose of my present paper to discuss the statistical problems, experiences, and lessons of these four enquiries.

It is not my purpose to set out, or to discuss, the facts disclosed by the enquiries. That is done in the relevant published reports. A brief sketch of the sampling method employed is given in each Report in order that the statistically-minded person may understand the procedure and the wider public be assured that some sort of statistical science has governed the production of the results it is asked to accept on what might appear to be so meagre a basis. But a report upon unemployment for general consumption is no place for a dissertation upon statistical technique or a discussion of statistical problems. These are more appropriate to the present occasion and company.

I will deal very briefly with what I will call "the Second One Per Cent. Enquiry" (that of November, 1924), for in the main it was a duplication of the first, and in the main it served to prove beyond all cavil that a soundly contrived one per cent. sample of a million or more persons can be accurately representative, for all intended purposes, of the whole body of persons from which the sample is taken. It is to be remembered that the chances of the same individual appearing in the second enquiry as had appeared in the first were perhaps 1 in 50,000 (on the assumption that 80 per cent. of the 1924 claimants had not been claimants at the time of the 1923 enquiry), yet the distribution of age, marital state, physique, health, physical defects, and industrial training came out as almost identical in the two enquiries. The 1924 enquiry showed some marked differences, *e.g.* the numbers of benefit claimants who were also in receipt of supplementary poor relief, but in all these cases there had been legislative or other influences at work, and the reliance which it was clear could be placed upon the identity of the results where there had been no such extraneous influence at work enabled one confidently to draw from the marked differences conclusions as to the effects of particular modifications in the Unemployment Insurance laws or their administrative application.

One theoretically trifling but practically convenient improvement made in the Second over the First One Per Cent. Enquiry was that

* Report on an Investigation into the Employment and Insurance History of a Sample of Persons insured against Unemployment in Great Britain. H.M.S.O. Price 3s. 6d. net.

of using a sample which was exactly one per cent. of the whole number of cases. In the first enquiry every schedule received from the Exchanges was regarded as statistically sacrosanct, and as the machinery of collection was not so refined as to ensure an exact one per cent. return, the schedules received totalled to varying fractions of the numbers of men, women, boys and girls in the investigational field, so that to conjecture how many persons the numbers in any particular category of the analysis represented in the country as a whole one had to use most inconvenient multipliers. In the second enquiry) as also in the third, with which I shall deal later) a surplus of schedules in each category was obtained, and the numbers reduced to exactly one per cent. of the whole by a process of random drawing. Consequently, in these Second and Third One Per Cent. Enquiries the gross numbers represented by the absolute numbers of persons in any department of the sample could be conjectured by adding two noughts to the figure. It will be agreed, I think, that this obtaining of more than sufficient schedules and random drawing of the surplus falls within the observances of statistical correctitude.

In respect of this Second One Per Cent. Enquiry I have now to make a confession and an *amende honorable*, and at the same time to ask guidance in a very real perplexity. In the discussion that followed upon the paper I read four years ago, Dr. Bowley avowed himself perturbed by a certain latitude given in the selection of the claimants who were to be asked to attend in the manager's room for interview. It may be remembered that in that first experiment we had required the Employment Exchange officers to tab every hundredth claim and to invite for interview the first claimant appearing at the Exchange whose claim, even though not tabbed, was among the five claims on either side of the tabbed claim. Dr. Bowley saw in this latitude a departure from the firm principles of correct sampling and an opening for possible bias. I agreed that the latitude was unnecessarily generous and promised to narrow it should a further enquiry be made (and indeed reduced it to three claims on either side the tabbed claim on the occasion of the second enquiry, and to one claim on either side on the occasion of the third), but I could not see, and would not admit, that any bias could creep in by reason of such latitude, be it great or small. But Dr. Bowley was quite right. Having to make certain sub-analyses of the circumstances and insurance history of persons who had been disallowed benefit but were still maintaining their claims as registrants for employment, we found that the proportions of these persons to the general body of claimants did not square with what we knew, from our monthly statistics, to be the true proportion. For a time we were at a loss to find any cause for this perplexing aberration. The explanation was

dropped upon by my colleague, Mr. Reeder. It was that a person in receipt of benefit attends the Exchange for the purpose of signing the register either every day or several days in the week, while the person disallowed but maintaining registration needs attend only once a week. It will be obvious that the latitude of any one out of so many on either side the tabbed claim laid odds on the recipient of benefit turning up first at the Exchange, and so gave a greater likelihood of his being invited for interview. It is improbable (I naturally now refrain from saying it is certain) that this bias introduces any material error into the results of the enquiry except on the specific point of the different insurance records of persons on benefit and of persons for the time being disallowed benefit, but on that specific point the latitude in which I saw no possible harm has certainly affected, though not beyond repair, the utility of a valuable fragment of the results of the enquiry. I mention this partly in acknowledgment of Dr. Bowley's rightness in the matter and partly as an object lesson to any who may be in danger of over-confidence that some particular departure from correct practice in sample enquiries will have no untoward results.

Have we, therefore, abandoned the allowing of this latitude, the arrangement of inviting for interview one of a small group centring on the tabbed claim? We have not; for to abolish the latitude creates a difficulty just as material, it seems to me, as the unfortunate bias in favour of the recipient of benefit. If we confined ourselves to the tabbed claim we should certainly want to interview every one of the persons represented by the tabbed claim. But, in point of practice, a proportion of such persons would not put in an appearance. Many would have got work, some would have gone out of insurance, a few might have gone overseas, a few would have died. Of these we should know nothing, except that in the particular five days chosen for the investigation they had not attended the Exchange; for we cannot in practice arrange for the personal interviewing of any except persons who come again to the Exchange after the tabbing has been done. Except as regards the information on the claim form and in the ledger we should not be able to introduce them into our analyses. As I have said, we have now cut down the range of latitude from eleven claims to three. We might go still further and reduce to two; but that might prove in practice insufficient to give an available invitee at each point in the claim file selected for sampling. I should appreciate greatly the opinions of members as to whether in any future enquiry there should be no latitude and the analysis contain a proportion of unknowns, or whether latitude should be allowed and the analysis, as hitherto, relate to persons about all of whom an equal amount is known. If

the former, should the "unknowns" count in the one per cent. or should they be surplus to it?

In another departure from the canons of correct sampling which it has been found necessary to make in these One Per Cent. Enquiries, Dr. Bowley pointed out, four years ago, the danger of distortions in the sample. It has not been found practicable to take an even one per cent. from all Exchanges, large or small. The interviewing, it is to be remembered, must be done by a person of experience and mature judgment; and it has been considered from the outset essential that the interviewing of male claimants should be done by the Exchange manager personally and that of female claimants by the senior woman officer. Had the ratio of 1 to 100 been strictly maintained at every Exchange in every area, the manager at, say, the Birmingham Exchange would have had to interview some 150 men and the senior woman officer some 50 women in one week, which would have absorbed far more time than could be spared by these officers from their already exacting daily duties. For these reasons it has been considered that no Exchange should be asked to report upon more than 30 men, or more than 40 individuals in all, men, women and juveniles. This limitation on the number at the larger Exchanges made it necessary, of course, to obtain more than one per cent. of cases from medium and small Exchanges; consequently the largest Exchanges, such as those at Liverpool, Sheffield, Birmingham, Glasgow and Manchester, are throughout under-represented in our samples.

In my earlier paper I took the view that so long as it was not proposed to make in the analysis comparisons between the conditions in larger and smaller areas, the cases in the medium and small centres were so similar to those in the large centres as to make it unlikely that this slight underweighting of the large centres could have any sensible effect on the results. I am bound to say, however, that when one seeks to use the cases thrown up by the sample for a special survey of some section of the whole field, this inequality in the geographical spread of the sampling is sometimes a nuisance. If one wanted, for instance, to pick out all the iron and steel schedules in order to visualize in fullest detail the kind of persons constituting the "unemployment problems" in that industry, the fact that there were only thirty cases all told in the sample from the Sheffield Exchange, and perhaps no more than half a dozen cases of iron and steel workers from the whole of the Sheffield area, would make that particular fragment of microscopic research unavailing. It may be that the under-representation of the large Exchange introduces some distortion into the general picture, but I do not think so. Dr. Bowley was, however, of opinion that an evenly-distributed sample

of as little as 1 in 300 would be preferable to an unevenly spread one per cent. Experience compels me to incline more to that view than I have hitherto done, and should another enquiry on these lines be made, the ideal of evenly-spread sampling shall be striven for.

During 1925 an enquiry on a sample basis was undertaken into the personal circumstances and industrial history of juveniles registered for employment. There had been, of course, a proportion of juveniles in both the First and Second One Per Cent. Enquiries, but the absolute numbers were relatively small, too small to be dependable in the lower ranges of analysis; and the information obtained on the general schedule did not include many items about which, in the special case of juveniles, knowledge was needed. Accordingly, in June-July, 1925, an enquiry confined to juveniles was made. For the purposes of this enquiry a sample of 10 per cent. was taken, which gave 3,331 boys and 2,701 girls. This may be regarded as disproportionately generous for a field of 60,320 cases relative to the previous enquiries into all persons, but it is to be borne in mind that the information obtained regarding each juvenile was more detailed than was the case with previous enquiries, and the subdivisions of the analysis were carried to a point at which the smallness of the number of cases in a sub-category would have introduced more chance of error than was thought desirable.

In the Juvenile Enquiry the field from which the sample was taken was not "claimants to unemployment benefit," but "persons registered for employment." The difference between these two aggregates is much greater in the case of juveniles than in that of adults; for children leaving school and others desiring employment may enter their names on the Employment Exchange and Juvenile Employment Bureau registers and maintain registration by weekly visits until employment is found for them or they otherwise obtain it. These have no industrial or insurance history and have no ground for making claim to benefit. For this reason, among others, it was more convenient to make the juvenile selection alphabetically, and every tenth registrant on a list of all juvenile registrants at each office arranged in alphabetical order was taken as the basis of sampling. In this enquiry also an excess of schedules was obtained and the surplus over an exact 10 per cent. withdrawn at random before tabulation.

A special difficulty in this Juvenile Enquiry was the selection of a week which should be as typical as possible of the whole year. Even with general enquiries some care has to be taken to avoid non-typical dates, but with juveniles the position is complicated by the sudden flow of school-leavers which occurs at the end of each term. The boys' and the girls' registers move in sympathy with this flow.

The registers normally begin to rise at or immediately after each school-leaving period, the rise being most marked at the end of the summer term. The curve tends to fall during the following weeks, to remain constant and then to rise again as the next school-leaving period commences. The lowest and highest points of the curve are necessarily determined by the state of employment, but during the last three years the influence of the school-leaving periods is clearly discernible. It appeared that the latter part of the summer term, when the curve had begun to flatten out, was the period most representative of an average of the whole year, and the Juvenile Enquiry was accordingly made in a convenient week of that period. This may be regarded as an example of time sampling in conjunction with case sampling.

I come now to the sample enquiry into the insurance and industrial history of the whole body of persons insured against unemployment.

Early in 1926 it began to be evident that while public knowledge of the composition of *unemployed* insured persons was considerable, there were wide gaps in the existing knowledge as to the insurance record and industrial history of the whole body of persons insured against unemployment - employed and unemployed alike. It was accordingly decided to collect particulars as to a sample of the whole body of persons for whom ledger accounts (*i.e.* the record of contributions paid, benefit received and particulars as to identity) existed at the Central Claims and Record Office at Kew.

The ledger accounts which are kept at the Claims and Record Office number about 17,500,000. This is a much larger figure than the total of persons insured under the Unemployment Insurance Acts, since it includes for various reasons the accounts of a number of persons who are no longer effectively in insurance. It was possible that we might require to know certain particulars about these as to that we had no exact foreknowledge - and in any case it would have been impossible to separate them out beforehand. The whole of the accounts, without distinction of past or present insurability, was therefore taken as the field.

The question now was, what size of sample should be taken? Obviously 1 in 100 was more than necessary and would be unmanageable, as it would yield 175,000 cases. It looked as though 1 in 500 might barely suffice. The actual sample must lie somewhere between these two ranges. Here a convenient method of selecting the accounts for examination presented itself. Each ledger contained on the average 218 accounts arranged, broadly speaking, for each Local Office, according to the date of the individual's original application for an unemployment book on entering into insurance irrespective of age, sex, industry or occupation. Obviously, one

account from each ledger presented a straightforward basis for sampling. Lest there should be any bias in the nature of the earlier accounts in the first ledger of each series, it was decided to take the last account in each ledger. This gave 80,233 accounts. The sample is thus one of 4.58 per thousand. This gives, it is true, an inconvenient multiplier; but the advantages of easy selection far outweighed the ease of raising sample figures to absolute numbers.

I have said that each ledger contained *on the average* 218 accounts. In actual fact some contained more—up to a limit of 350—and some contained less. The average number of accounts in each ledger was obtained by a count of about 3,500 ledgers spread over the whole range of accounts. This count provides the basis for our estimate of 17,500,000 accounts as the Claims and Record Office aggregate, and provides yet another example of estimation by samples. The sample of 1 in 218 gave 80,233 cases. This again appeared to be on the generous side by comparison with the 10,000 or so cases which had been found to serve adequately for the One Per Cent. Enquiries. It was known, however, that a proportion of these would be lapsed accounts which would need possibly no analysis and at most very little. In fact, the cases in the sample which proved to be those of “insured persons” in the established sense of the term numbered 58,347. This would seem to be reasonably in keeping with the 10,000 or so cases taken by the one per cent. sample from the smaller field. We might perhaps have saved half the work by taking the last account in every other ledger without undue risk of troublesome error, but that is doubtful.

It was possible to test the composition of this sample in some of its features by comparison with data obtained in the ordinary course from the working of the Unemployment Insurance Scheme, and also to some extent from the results of the Population Census of 1921. For example, I have already said that the whole range of 17½ million ledger accounts includes not only those who were actively in insurance when the sample was taken, but also those who had passed out of insurance since November, 1920. The first step taken in handling the schedules containing the particulars derived from the ledger accounts was to separate out those schedules on which no transaction either as regards payment of contributions or applications for benefit had appeared since July, 1925, *i.e.* roughly one year and nine months before the sample was taken. This was the best criterion available for obtaining a sample which would reflect as accurately as possible the individuals who were effectively within the scheme of unemployment insurance. It was still necessary, however, to make allowance for the fact that the balance would include a certain number of individuals (probably between 2,000 and 2,500) who had passed out of insurance between July, 1923, and July, 1925, but in respect

of whom some record had been made for the year July, 1924, to June, 1925. After making due allowance for these, it was found that in point of numbers the sample representing the individuals then within the scheme of insurance corresponded very closely indeed with the numbers of insured persons as determined from the actual exchange of unemployment books at July, 1925, which gave highly satisfactory confirmation of the accuracy of that estimate of the "Numbers of Insured Persons" which is made annually on the strength of the data obtained at the Annual Exchange of Books. Moreover, it was also found that the subdivision of the sample as between males and females was almost exactly the same as that appearing in the appropriate estimate of the numbers of insured persons. These latter estimates, which are computed once a year from information derived from the exchange of unemployment books, include, moreover, statistics in respect of the numbers within each of the 100 industrial groups for which figures are presented each month in the *Ministry of Labour Gazette*. Here again was a means of testing the reliability of the sample by comparing, for males and females separately, the proportion which each industry formed of the total in the sample and also in the estimated numbers of insured persons at July, 1925. This comparison showed a high degree of conformity between the two sets of figures.

The information obtained from the ledger accounts included, of course, the age of the insured person, and this enabled tables to be prepared showing the age distribution of insured workpeople in each industry. Inasmuch as the scope of the insurance scheme does not include all occupied workpeople in every industry, an exact comparison with the results of the 1921 Census was not possible. The differences between the bases of the two sets of figures would be expected to result in a rather lower average age among insured workpeople than among those of occupied persons as a whole, aged sixteen and over. This, in fact, actually appeared from the analyses. The comparison was extended to certain of the larger industries, and here it was found that, as a general rule, the percentages within each age group for any individual industry represented in the sample and in the Census figures were very similar.

The analyses prepared from this sample were not confined merely to the particulars obtained from the ledger accounts themselves. In cases where the ledger account showed that the insured person was a claimant for benefit at an Employment Exchange, the schedule was sent to the Exchange in question and all the particulars relevant to him which could be obtained from an examination of the documents, for example, marital state, nature of benefit authorized, and dependents, were entered on the schedules. When these particulars came to be tabulated it was found that the results corresponded very

closely with those obtained from the one per cent. samples of benefit claimants of 1923 and 1924, although the selection of this new sample had been made on an entirely different basis, *i.e.* it was the unemployed portion of a spaced selection from the whole body of insured workpeople, whereas the two previous investigations had related to a selection made from claimants to benefit only.

By this particular application of the sample method it was possible to present, within a few months, a detailed account of all the immediately relevant circumstances of 17,500,000 persons. Apart from the strictly insurance information as to contributions, benefit, etc. which it yielded, it furnished, for the first time, an age distribution of persons insured against unemployment, industry by industry, and from this distribution it was for the first time possible to tabulate the rate of unemployment among persons of various ages not only among the insured population as a whole, but among persons engaged in particular industries. Although "persons insured against unemployment" is not a Census category, the results of the enquiry have in some degree served as inter-censal data concerning a very large section of the "occupied" population. Should a further investigation of the same kind be made at some future date the differences revealed by a comparison with the result of this first investigation will doubtless yield facts and suggest inferences which will contribute much to the value of the information then obtained.

In April, 1927, a Third One Per Cent. Enquiry into the personal circumstances and insurance history of a sample of claimants to unemployment benefit was made. Its broad lines were much the same as those of the 1923 and 1924 enquiries, but modifications in the information obtained and in the manner of its treatment were made in order to economize on features about which enough was known, and to provide for the intervaluation or enlargement of features which had come to be important.

It is no part of my purpose to describe the new features which are brought for the first time into prominence in this Third One Per Cent. Report, but very briefly they consisted in using the material concerning contributions and benefit in order to classify, according to employment and unemployment record, the persons represented in the sample. The statistical moral of these new features is that, given a set of schedules compiled from a properly constituted sample, analyses of all kinds can be made at will or on particular occasion. It should be said that none of these modifications was allowed to affect the fundamental comparability of the series. It is hardly necessary to say that the results obtained from this third enquiry confirmed once more, by comparisons with the second and third enquiries, the reliability of the sample method.

In the table below a comparison is made of the age distribution

obtained from the three One Per Cent. Enquiries regarding claimants to benefit made in 1923, 1924 and 1927.

| Age Groups. | Males. | | | | Females. | | | |
|-----------------------------|----------------------------|----------------|---------------|---------------|----------------------------|----------------|---------------|---------------|
| | Number (April 1927). | Percentages. | | | Number (April 1927). | Percentages. | | |
| | | April 1927. | Nov. 1921. | Nov. 1923. | | April 1927. | Nov. 1921. | Nov. 1923. |
| 16 and 17 (2 years) | 124 | 1.5 | 1.9 | 1.9 | 83 | 6.2 | 4.7 | 6.0 |
| 18 „ 19 (2 „) | 440 | 5.2 | 4.9 | 4.7 | 211 | 15.7 | 12.9 | 16.0 |
| 20 to 24 (5 years) | 1,278 | 15.2 | 15.6 | 16.5 | 426 | 31.7 | 30.3 | 30.3 |
| 25 „ 29 (5 „) | 1,184 | 14.1 | 12.4 | 12.0 | 207 | 15.4 | 18.2 | 17.1 |
| 30 „ 34 (5 „) | 843 | 10.0 | 9.2 | 10.3 | 118 | 8.8 | 10.1 | 10.1 |
| 35 „ 39 (5 „) | 782 | 9.3 | 17.4 | 17.1 | 90 | 6.7 | 12.1 | 10.8 |
| 40 „ 44 (5 „) | 714 | 8.5 | | 63 | 4.7 | | | |
| 45 „ 49 (5 „) | 754 | 9.0 | 17.3 | 17.8 | 52 | 3.9 | 7.8 | 6.0 |
| 50 „ 54 (5 „) | 728 | 8.7 | | 42 | 3.1 | | | |
| 55 „ 59 (5 „) | 642 | 7.6 | 7.8 | 8.2 | 25 | 1.8 | 1.6 | 1.4 |
| 60 „ 64 (5 „) | 529 | 6.3 | 13.5 | 11.5 | 17 | 1.3 | 2.3 | 2.3 |
| 65 „ 69 (5 „) | 361 | 4.3 | | | 10 | 0.7 | | |
| 70 and over (indefinite) | 25 | 0.3 | | | — | — | | |
| Total, all ages | 8,404 | 100.0 | 100.0 | 100.0 | 1,344 | 100.0 | 100.0 | 100.0 |

In the following table is set out, in order that the results on a point of detail obtained from three of these enquiries may be compared, the percentages of claimants, with and without dependents, for whom dependents' benefit was authorised. The close similarity of the figures, even in the smallest categories, will be remarked.

| | Males. | | | Females. | | |
|---|-----------------------|-------------------------|-------------------------|-----------------------|-------------------------|-------------------------|
| | 1926, 1 in 218. | 1921, 1 per cent. | 1927, 1 per cent. | 1926, 1 in 218. | 1921, 1 per cent. | 1927, 1 per cent. |
| Number of claimants with no dependents authorized for benefit ... | Per cent. 48.7 | Per cent. 50.0 | Per cent. 46.2 | Per cent. 97.7 | Per cent. 97.7 | Per cent. 98.5 |
| Number of claimants with dependents authorized for benefit ... | 51.3 | 50.0 | 53.8 | 2.3 | 2.3 | 1.5 |
| Of claimants with depend- ents: — | | | | | | |
| Number claiming in re- spect of adults only | 30.6 | 35.3 | 33.6 | — | 9.1 | 16.7 |
| Number claiming in re- spect of children only | 5.8 | 6.5 | 6.6 | 100.0 | 90.9 | 83.3 |
| Number claiming in re- spect of adults and children ... | 63.6 | 58.2 | 59.8 | — | — | — |
| Of claimants with dep- endent children, average number of children ... | 2.4 | 2.4 | 2.3 | 1.1 | 1.4 | 1.2 |

I have already referred to the relation between the results of the 1 in 218 enquiry of 1926 and the figures for "Occupied Persons" shown in the Census of Population tables. The table below compares the age distribution of Insured Persons in 1926 with that of "Occupied Persons" in 1921.

| Age groups. | Males. | | Females. | |
|---------------------|---------------------------------|---------------|---------------------------------|---------------|
| | Insured persons, April 1926. | Census, 1921. | Insured persons, April 1926. | Census, 1921. |
| 16-17... .. | 6.5 | 5.5 | 11.1 | 10.8 |
| 18-19... .. | 6.7 | 5.6 | 13.4 | 11.5 |
| 20-24... .. | 16.0 | 12.3 | 28.1 | 22.7 |
| 25-29... .. | 12.5 | 11.3 | 16.1 | 13.4 |
| 30-34... .. | 10.6 | 10.8 | 9.5 | 8.9 |
| 35-44... .. | 18.6 | 20.9 | 11.7 | 13.7 |
| 45-54... .. | 15.6 | 17.7 | 6.5 | 10.0 |
| 55 and over ... | 13.5 | 15.9 | 3.6 | 9.0 |
| Total, all ages ... | 100.0 | 100.0 | 100.0 | 100.0 |

The enquiries dealt with in this paper were all conducted by the method of sampling which has no apt name, but which might be called "measured jump" sampling. There are, of course, other types of sampling, such as that of selecting for complete or large-sample examination a number of areas which in their aggregate may be expected to be representative of the entire area over which the cases are spread. Some thought has been given to the possibility of employing this method for the obtaining of information regarding unemployment, but local differences in industrial conditions are for the moment so great as to render it unlikely that a selection of areas could be made which would be truly representative of average conditions throughout the kingdom.

It would be ungracious to end any paper on Enquiry by Sample without reference to the two Reports on "The Representative Method in Statistics" and "The Representative Method in Practice" prepared by Hr. Adolph Jensen, Director of the Statistical Department of Denmark, as *rapporteur* for the Commission appointed by the International Statistical Institute in May, 1924. I should like to pay my personal tribute to Hr. Jensen and his colleagues for the service they have rendered many of us in issuing these Reports. All who are called upon to concern themselves with the conduct of enquiries by sample have in them a most valuable compendium of international knowledge in regard to the philosophy and practice of sampling.

DISCUSSION ON MR. HILTON'S PAPER.

MR. C. P. SANGER: It is my pleasant duty to propose a vote of thanks to Mr. Hilton. His paper has many merits; it deals with a very important subject; he has suggested various points on which he asks for guidance; it is lucidly written and it is short. When, four years ago, Mr. Hilton read a paper on a similar subject, the discussion was conducted by a very eminent set of statisticians, and many of the things they said then were very valuable. It interests, though it does not surprise me, to find that Professor Bowley on that occasion was quite right in the criticisms that he made. The truth is that we always err if once we deviate from the straight path of random chance. Professor Bowley's criticisms have been justified, but the reader of the paper very naturally wants further guidance as to how far he is to go, and there is this fundamental difficulty, that if you can only get your information by an interview, and if a certain number of the group cannot be interviewed, it is quite clear that a perfect result cannot be expected.

I should like to know more about this system of tabbing. I take it that first you tab one person—one in eleven, and one out of those eleven always turns up. You then cut that down to three. Does one in three always come to the Exchange? Yes. If you cut that down to one, that one would not always come; and two is doubtful. Even if you got down to two you would still get cases where the thing broke down, and that obviously raises very difficult questions which I do not know that I am prepared to solve at the moment.

If asked for my opinion, I must confess that I should give my vote against giving any particular latitude. I would rather have a number of unknowns that are knocked out than allow this amount of latitude.

Sampling is very important for the reason that nearly all statistical enquiries tend to be very lengthy and expensive. When I look at the long volumes published by the various Departments of various Governments, I wonder whether they were worth the expense of production. If you can get an accurate and intelligent sample, all that can be reduced very much—both expense and time. Many of the statistics that we get are already almost out of date by the time they are published. Therefore the theory of sampling is very important, and I agree with the reader of the paper that it is for the mathematicians to give us appropriate formulæ; but if there are a great many statistics for varying purposes it is not easy, if indeed possible, to give one formula.

There is one method that I think the best, and that is, supposing you have a one per cent. sample—say ten thousand cases out of a million—you split that sample into two and apply the results to the two samples; if the results for those two are the same as those for the ten thousand, then you are quite safe and obviously have not gone too far. That is not always a very elaborate or expensive thing to do, and it seems to me that a test of that kind is much safer than relying on a formula which may be quite valuable for one purpose

but not for another where the circumstances are not quite the same. I think the Ministry is rather lacking in boldness; I should have started with one in a thousand and then split that into two, and if each one in the five hundred sample agreed with the other, you would be quite safe. I think that might have been a more prudent course.

There is one other small point—that of having the ratio exact. That seems to me to be admirable, and it is very important to save the immense amount of arithmetic liable to be produced by statistical enquiries.

I wish to offer my best thanks to Mr. Hilton for his most excellent paper.

PROFESSOR BOWLEY: I have great pleasure in seconding the vote of thanks to Mr. Hilton. I have always taken a strong and personal interest in his enquiries, and I think Mr. Hilton and his Department are very much to be congratulated in having taken this step and applied this particular scientific principle to the saving of time and labour. I wish to express my deep appreciation of both Mr. Hilton's acceptance of some of the suggestions I was glad to make four years ago, and also of his courage in bringing his revised practice into light. Further, Mr. Hilton has asked the help of mathematical statisticians, and on this particular problem my colleagues and I will certainly be very much indebted to Mr. Hilton if he will send his problems to us in order that we may consider them *ad hoc*. I agree with Mr. Sanger that there is no universal formula to be applied, but when the problem is stated, mathematicians can generally supply an adequate formula.

With regard to the rest of his questions as to the size of the sample, etc., I beg to emphasize the fact that it is not the major number of the universe, but the minor number in the sample, that dominates the precision. A rule that used to be given was that the square root of the number in the sample that had a particular attribute measured the standard deviation of that number, and in fact this tends to give a superior limit to the standard deviation. That is one of those formulæ which it is dangerous to use without analysis, but it is suggestive, and when one is considering how far the sample should be subdivided, it is rather the smallest entry in the final table that should be considered. When I see an entry of only one in one panel, I say to myself, "the square root of one is one," but for all I know that number may very well be two. That is a way of approach to which I think more attention might be given in future work of that kind, before the subdivision has in some cases been carried to an extent that is dangerous if people are taking numbers too literally.

On the point in which Mr. Hilton changed his plan, there is nothing mysterious about the caution I ventured to give at the former meeting. If we are to depend on the theory for these purposes we must keep the chance of entry unchanged throughout the whole enquiry. If we give a latitude to persons not tabbed, but near the tab, we are then certainly introducing an attribute "attendance at the Labour Exchange for that particular week," and making a sample not of all

persons unemployed, but of persons attending the Labour Exchange in that given week, which is not the same thing.

As regards the remedy, there are two possibilities. One is to tabulate separately the untabbed and the tabbed, and see if the absence of tabbing does make any difference. In the final report to the public these difficulties may be submerged if fairly tackled in the office. The other method is to enter so many persons as unknown and then to keep them as unknown as a percentage as regards the age of people. The statistician may then do what he pleases about the two percentages and see whether the difference will affect his argument or not.

There is another point on which I am much more nervous, and that is the difference of the proportion in different regions. I am not certain whether these differences were rectified in the sample. For example, if I took one in fifty in Oxford and one in two hundred in Coventry, they should be brought into line by multiplying the latter number by four, and that, I think, was not done. If there is an unevenness in the proportions in the districts, though the proportion in the whole (if corrected) is unlikely to be affected, yet the *error* to which the proportion is liable is certainly affected in formula and may be affected in fact. It is quite possible to write down the formulæ for these standard deviations, but to make them of use it would be necessary to have the details and know what difference there was in the distribution in the larger centres and in the smaller ones, but I certainly would prefer, even at the expense of temporary neglect on the part of some other duties, that uniformity in sampling should be preserved. One loses the value of sampling if that rule is broken.

Mr. Hilton referred to the report of the Commission of the International Statistical Institute at Rome. I think that if he would have the patience, himself or by deputy, to study the whole of the report, he would probably find the answers to most of his questions therein contained. In particular he would find, towards the end of my contribution, an analysis of the increased security that may be obtained by a representative sample as opposed to a purely random sample. The conclusion I came to was that the additional security under ordinary circumstances is slight, and although there is an absolute security in the sense that you know you have not omitted any essential group in that process, yet it is not worth striving after at the expense of any other of the major conditions of the sampling process. That is, again, a question which should, I think, be submitted to an expert in each particular case to decide, whether one method or the other ought to be followed.

There are two points I should like to name : (1) A general question of these insurance statistics. Does the limit of £250 make a serious difference, in the sense that as salaries are going up people are removed out of insurance, and if salaries are going down they are brought into insurance? (2) In the 1926 enquiry there proved to be some failure in the definition of categories, because the distribution among industries in the sample and the total was so far from agreement that it was quite impossible to bring in any measure of "good-

ness of fit " at all. In two or three industries the difference was so tremendous that I felt sure there must be some alteration in definition. These things cannot be rectified by any kind of sample.

DR. ISSERLIS said he was glad to have the opportunity of adding his words of appreciation to those already accorded to Mr. Hilton for giving another example of the way in which investigations based on samples were treated. He would not follow the proposer or seconder into the details of the technique. All statisticians had occasion to deal with samples, and the more often they could have an opportunity of being warned of the traps that existed, the better it would be for them.

He would like to deal with one point in the paper that struck him as being of importance, namely that where one got a sample which by its size and method of preparation was sufficient when taken as a whole to give reliable results for the whole sample, there might be a very grave danger in analysing the data to any great extent—that was to say, in reaching conclusions for sub-samples. That could be illustrated by considering the sample which some colleagues of his were considering earlier that day. This was a sample of four thousand or so taken from a total population of three millions. As it happened, the persons entrusted with the preparation of portions of the sample had obviously prepared biased sub-samples. (He was speaking of an age distribution; individuals contributing portions of the material had concentrated on one age, about twelve or fourteen, and in other cases on another age, about eight or nine.) In this sample of four thousand out of a population of three millions, the age for the whole sample turned out to be a very accurate indication of the mean age of the whole population. But it would be very dangerous to base any conclusions regarding other factors than age in the case of the subordinate samples.

Dr. Isserlis was struck by the table on p. 529, where there was a percentage of the results of three samples in 1924, 1926, and 1927. The tables were quite simple, and the close similarity of the figures even in the smallest categories was remarked on by the author. In the 1926 sample, which was a sample of 1 in 218, 100 per cent. of that portion of the sample which consisted of women claimants with dependents came into a certain category, but in 1927 only 83.3 per cent. He thought that the total number involved there was about four thousand, and it could not be a very stringent test that described these two proportions as showing a close similarity. On general samples one might have expected the 1926 enquiry to have produced a larger number of women claimants with dependants than the 1927 figures.

SIR JOSIAH STAMP said that Mr. Hilton had given so much that it was a little ungracious to ask for more, but one was tempted to do so for the following reason:—Here was an attempt to judge the validity of samples of different proportions by a comparison of samples not of the (actually) same material at the same time, but of *similar* material at different times, and therefore in these tables

there were combined two different things. Any difference there might be due either arithmetically to the size of the sample or to the absolute difference in the material itself, or to both combined. Mr. Hilton's samples were numerically very large as compared with the samples that had to be made in many other branches of statistical work, and his sample by itself was as large as the aggregate that very often in business one wanted to sample.

It would have been pleasing if he could have regarded the sample he got as though it were an aggregate (ignoring altogether the large number as though it did not exist)—a random aggregate of which the details were fully known, and which therefore did not actually need sampling—and then taken a sample of that, by double-tabbing every so often—say, one in twenty—and then compared the known aggregate result with the results of that five per cent. sample, and shown the degree of arithmetical divergence. That would have been of great value to many, in enabling them to compare *actual* aggregate results with a sample, and this double-tabbing would have given the kind of sample that in actual practice had so often to be made. He did not know whether it would be possible for Mr. Hilton to go over his material or have the double-tabbing done in that way, when the samples could be sub-sampled. If Mr. Hilton could show what a random five per cent. sub-sample gave compared with the aggregate figures he had given in his sample, he would contribute something of tremendous value to many, in the vague assumption, doubtless based on no mean authority, that a five per cent. sample of reasonably regular material was a sufficient sample for all ordinary purposes.

DR. BRADFORD HILL said he had only one or two minor points to put to Mr. Hilton with regard to his interesting paper.

Turning first to the vexed question of the "tabbed and nothing but the tabbed," Mr. Hilton seemed to fear the "unknown" group; but had these "unknown" proved entirely such a disadvantage as Mr. Hilton appeared to think? Surely if in any one week there were so many names recorded on the Register of the Labour Exchanges, it was of some value to know what proportion of these really represented claims which had ceased to be effective or were, one might say, defunct. Alternatively, would not Mr. Hilton say how many people there were who were so abandoned in spirit as to keep their names on the Register, though all the allurements of the Labour Exchange could not draw them thither once a week!

With regard to the over-weighting of the small centres and the under-weighting of the large, Mr. Hilton's opinion was that the claims from both centres were so similar in type that no error could arise from this method of securing the sample; yet on the second page of the paper he said that details were obtained with regard to these people for such things as industrial training, health and general physique. Surely if one took a town like Liverpool with a low-grade Irish population and a dock population, in the unenviable position of having the highest death-rate in the country, the claims with regard to such characteristics as health and physique must differ materially from claims in smaller rural towns like Chelmsford. It

seemed incredible to Dr. Hill that such places should produce similar claims.

With regard to the ledger sample, Mr. Hilton had pointed out that there might be a bias in taking the early records in each ledger, and therefore they confined themselves to the final records. If in the earlier records there were massed some particular type of claim, by confining himself to the last was he not falling from the frying-pan into the fire? In the final sample that he obtained, this first type of case would not be adequately represented.

PROFESSOR GREENWOOD said he should certainly not occupy five minutes, but there was a little difficulty he would like to have cleared up. He could not quite see what one was going to get out of Sir Josiah Stamp's experiment. He understood Sir Josiah to have suggested that Mr. Hilton should treat his sample as a "universe" and draw random samples from that new "universe." If Mr. Hilton did so, and if the results of the experiment were inconsistent with the expectation afforded by the theory of random sampling, the only inference to be drawn would be that the "universe" had not been randomly sampled. No such experiment performed upon a sample raised, *pro hac vice*, to the rank of a "universe" would throw any light upon the question whether the sample given, for the purpose of the experiment, brevet rank were or were not itself a random sample of another "universe."

THE CHAIRMAN said there was little that he could add to what had already been said. He would only refer to one point—the particular question as to whether any margin should be left on either side of the tabbed form. He felt that even if no margin were left on either side of the tabbed form, it was still possible that there might be biased results if the proportion of tabbed people who did not turn up was at all considerable. If any considerable proportion did not turn up, since the portion not attending might (and probably would) be a biased selection, the remainder might be an appreciably biased selection also. Bias would not be avoided.

The vote of thanks to Mr. Hilton proposed by Mr. Sanger and seconded by Professor Bowley was now put to the meeting and carried unanimously. The Chairman called upon Mr. Hilton to reply.

MR. HILTON, replying, said: I should be very glad if I might have the Chairman's permission to refrain from any attempt at a formal reply this afternoon, that I may the more carefully think over what has been said and deliver myself later of some remarks in writing for inclusion with the printed report.

For the moment I will do no more than, first, correct the idea that I uphold in my paper uneven geographical distribution and, second, assert definitely that more bias would be introduced in taking the front account in each ledger (at which point in those ledgers which begin a series a cluster of claims of a particular type may be suspected) than in taking the last.

It is to me a very great privilege to lay before the members of the Society an account of the obstacles and problems we encounter in the course of our statistical adventuring, and to receive, in general discussion, the informed comment and expert guidance of such distinguished Fellows as have spoken this afternoon. We shall ponder what has been said and use it to good purpose.

The following reply was afterwards received from Mr. Hilton :—

I am not sure that I have even yet made plain to everyone the precise nature of the difficulty which led us to adopt the practice of allowing latitude on each side of the tabbed claim. The point is that the tabbing has to be finished and the tabs all in order before the interviewing begins. In practice the tabbing has to be done at the very beginning of the interviewing week. Now, between the act of tabbing and the time of expected appearance for interview a certain number get work or for some other reason cease to have occasion to attend at the Exchange. Of these, all we know is what the claim form tells us. We are in the dark as to (1) all those things that can be learned only from an interview, and (2) their condition, whether unemployed or employed, at the date assigned for interviewing. The trouble lies in that inevitable lag between the snap-shot operation of tabbing and the slower operation of interviewing. If we confine ourselves to the tabbed claimant we darken our picture by losing from it precisely those who, at the time of tabbing, were on the point of starting work. If we give the sort of latitude we have been in the habit of giving we get our picture coloured by an undue presence of those people who visit the Exchanges most frequently during the week.

I doubt if the separate tabulation of tabbed and untabbed would help us much. Once the "any one of three" is allowed the tabbed card has no longer any significance; it is merely the centre card of the block of three. (The rule is not, "should the tabbed person fail to turn up substitute one of the others," but "send for interview the first of the three that appears.") The other method suggested by Dr. Bowley, that of entering those who do not turn up as "unknown," requires the abandonment of all latitude. Then for every 100 people we tab, complete schedules will be returned for perhaps 90 and incomplete schedules for 10. Our main tabulation must be confined to the 90. I still do not like the idea of basing our main picture of "the unemployed" upon schedules which admittedly under-represent those who at the time were on the point of getting work—even though we append a supplementary skeleton table showing the numbers, ages, etc., of those "unknowns" among whom the "since-got-works" form an unknown proportion. I begin to be convinced that the problem as I have set it is insoluble; that by no device or dodge can one rectify the errors inherent in seeking to study a moving crowd by taking a snap-shot of it one week and questioning those people who are still available the next week. Our latitude introduces errors, but any other method which leaves a gap in the information concerning those people who fail to turn up must give a picture with distortions. I am at one with Dr. Bradford Hill

in the belief that there would be value in knowing what proportion of claims had ceased by next week to be "live"; but to work those cases into our main tabulation we want to know much more than the negative fact that the claimant has ceased to claim. No, the discussion has served to drive me back to first principles and to supposed absolute limitations of practice. The ideal method, and the only statistically correct method, is to tab each hundredth claim and then set about obtaining full particulars of each person so "tabbed" even to the point of seeking out those who fail to turn up and inviting them to supply the information required. I have always spoken of this as quite impracticable, but it seems to me now that we must go back and look again very carefully at this that we have always taken for granted.

There are great practical difficulties in the way of spreading the sample evenly over all Exchanges in exact proportion to their numbers of claimants. We have hesitated to make corrections for under- and over-representation as suggested by Dr. Bowley because of the complexity it would introduce into what is otherwise a fairly straightforward treatment and presentation of the facts, though I agree that some of the errors introduced by unevenly-spread sampling might so be minimized. Again, the course indicated is to see whether the initial departure from correct practice cannot be avoided. I have no longer any doubt that a smaller sample than 1 per cent., if distributed evenly, will give truer results than a one-per-cent. sample unevenly distributed, but to find the precise point at which size of all-over sample best harmonizes with the ability of the largest Exchanges to handle a large number of interviews will require careful determination.

On the question of testing the validity of the sample as a whole, and of measuring its deviation from absolute representativeness, by arbitrarily dividing the sample at random into parts and comparing the results of tabulating the parts separately, I may say that more complexity would be introduced into the work of tabulation by this innovation than might at first sight be supposed. Even now the main block of tabulation work connected with a one-per-cent. enquiry, organized with the foreknowledge born of several earlier experiences, taxes the energies of round about twenty clerks for a whole month. To make even so simple a pure sampling test as that of dividing and treating the schedules in two random halves would mean a very considerable increase in the work. I confess I have from time to time been allured by the prospect of establishing something absolute regarding the measure of trustworthiness of samples of a given size and proportion by some such procedure, but now Dr. Greenwood has gone and undermined even that innocent hope. Yet not quite in the way in which he draws his particular question mark. We could, I think, guarantee that such a partition was made at random. But would not the results merely reveal the vagaries of chance in this particular exercise? Or would a comparison of the absolute numbers in the descending sub-categories throw up some general indication of probable representativeness confirming or modifying that given us by Dr. Bowley?

We have had occasion, as it happens, to conduct more intensive enquiries upon a random sub-sample of our main sample along very much the lines mentioned by Dr. Isserlis. On pages 38-44 of the Report on the 1 in 218 sample of 1926 will be found analyses based upon one in every five of the main-sample schedules. The fact is not mentioned in the Report, but I may say that the age and industry distributions of the one-fifth sample of the sample proved to be practically identical with that of the sample itself. This may merely prove, as Dr. Greenwood suggests, that we were lucky on this occasion, and may leave us in doubt as to whether our luck would hold next time. I am content to state the fact and to draw from it some assurance that had we been needing only age and industrial distribution from our main enquiry we could have managed well enough with one-fifth the cases.

Dr. Bradford Hill's conundrum as to the relative unsoundness of taking or avoiding that part of the ledger where bias is suspected is, I think, capable of answer. If we knew, for example, that the first account in every ledger was the account of a carpenter, and that thereafter the accounts were scattered indiscriminately, carpenters among the rest, we should introduce vastly more bias by taking the first account than by avoiding it. That is a much-exaggerated version of what we suspected of the composition of the ledgers, and I think we were in the right in determining to take some account in the ledger other than the first.

Dr. Bowley asks about the movement into and out of insurance of people crossing the £250 limit. There is such a movement, but does not amount to very much. It must be remembered that the £250 limit applies only to non-manual workers, that those who are employed wholly or mainly by way of manual labour are insurable whatever their earnings. The class to which it applies is therefore relatively small. Within this class there is, of course, a fairly steady stream of persons rising out of insurance as their salaries increase; that is one of the recognized channels of "wastage" from insurance; but the process ordinarily is continuous and does not interfere with statistical comparisons. The £250 limit introduces an erratic element only when the value of money is changing, when wages and small salaries are rising or falling in sympathy, and when considerable numbers of this non-manual class may find themselves solely for that reason passing within or without the scope of the Act. That is not the case at the present time.

The discrepancies in the industrial distribution of the persons in the 1926 sample were in part due, I am sorry to say, to an error in tabulation which was not appreciated until after the publication of the Report. In some cases the ledger account which fell into the sample did not specify the industry in which the contributor was employed. These should have been tabulated as "Industry not stated," but unfortunately they were included in the category "Other industries and services."

A further source of discrepancy arose from the fact that it was impossible to obtain an exact sample of the persons who were enumerated as insured at July, 1925. The enquiry was made in April, 1926,

and the sample included not only those who were insured at July, 1925, but in addition those who had entered insurance between July, 1925, and April, 1926, and (what was more serious) a number who had passed out of insurance between July, 1923, and July, 1925, but who could not be identified and eliminated when the sample was taken. These factors might easily account for a part of the discrepancies, since the rate of growth (or decline) is not the same for all industries by any means.

As a result of the ballot taken during the meeting, the candidates named below were elected Fellows of the Society :—

Walter Lindsay Johnston.
George Abercromby Mitchell.

James Percival Upham.
Leyshon Richard Williams.

Corporate representatives.

Percy Cohen, *representing* the Conservative and Unionist Central Office.
Cecil Arthur Rowley, *representing* the Westminster Bank, Limited.

MISCELLANEA.

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PURPOSIVE SELECTION.

By ADOLPH JENSEN.

At the XVth Session of the International Statistical Institute at Rome in 1925, Professor *A. L. Bowley* presented a particularly interesting memorandum on measurement of the precision attained in sampling.*

The most noteworthy thing in that paper is the application by the author of the principle that a mathematical measure of the precision can be given, not only when use is made of ordinary *random selection*, but also in the case of the method which has been called *purposive selection*.

Professor Bowley defines this latter method thus: "Here the unit of selection is a district or group, every member of which is included in the sample. The selection is so made that the aggregate of the districts gives the same results as the universe in respect of certain quantities (called "controls") which are known in the districts and universe and which are correlated with the unknown proportions or quantities which are the subject of investigation."

It appears from the formula set up by *Bowley* † that the precision depends, among other factors, upon the following :-

1. The number of groups included in the sample;
2. The variation of the quantity or proportion investigated between the groups;
3. The correlation coefficient between the quantity or proportion under investigation and the control;
4. The number of controls.

Bowley emphasises, however, that in ordinary problems the use of controls does not increase the precision greatly and that little

* *Bulletin de l'Institut International de Statistique*. Tome XXII, 1^{re} livraison.

† *l.c.* page 49, formula (13).

improvement is obtained by increasing the number of controls, especially if they are correlated with each other.

These conclusions are worthy of attention, so much the more as they are in opposition to the view which hitherto has been general among statisticians. Undoubtedly the importance of controls has been greatly overrated in many quarters.

On the other hand, I am afraid that the emphatic reiteration that the usefulness of controls is limited might cause purposive selection to appear in a less favourable light than is right and proper. It is this fear that has led me to offer the following remarks.

Bowley is perhaps right in saying that the controls can rarely increase the precision by as much as 30 per cent.; but, in my opinion, even improvements which come within that limit are of the greatest interest if the matter is regarded from the point of view of the practical statistician.

In the first place, it is of importance to be quite clear as to what rôle an increase of the number of groups plays in comparison with the importance of more or less good correlation when only one control is used.

All other conditions being equal, the standard deviation of error in estimating from the sample the average or proportion in the universe will vary partly with $\frac{1}{\sqrt{n}}$, where n is the number of groups, and partly with $\sqrt{1-r^2}$, where r is the correlation coefficient. The following table gives a convenient survey of the factor whereby the standard deviation varies with a number of combinations of different values of n and r :—

Number of Groups.

| $r =$ | | | m | $2m$ | $3m$ | $4m$ | $5m$ |
|-------|-----|-----|------|------|------|------|------|
| 0.0 | ... | ... | 1.00 | 0.71 | 0.58 | 0.50 | 0.45 |
| 0.1 | ... | ... | 0.99 | 0.70 | 0.57 | 0.50 | 0.44 |
| 0.2 | ... | ... | 0.98 | 0.69 | 0.57 | 0.49 | 0.44 |
| 0.3 | ... | ... | 0.95 | 0.67 | 0.56 | 0.48 | 0.43 |
| 0.4 | ... | ... | 0.92 | 0.65 | 0.54 | 0.47 | 0.42 |
| 0.5 | ... | ... | 0.87 | 0.61 | 0.51 | 0.44 | 0.40 |
| 0.6 | ... | ... | 0.80 | 0.57 | 0.47 | 0.41 | 0.37 |
| 0.7 | ... | ... | 0.71 | 0.50 | 0.42 | 0.37 | 0.33 |
| 0.8 | ... | ... | 0.60 | 0.42 | 0.36 | 0.31 | 0.28 |
| 0.9 | ... | ... | 0.44 | 0.31 | 0.26 | 0.23 | 0.20 |

The table shows how important it is to select a control which has good correlation with the quantity under investigation, and it also shows that if this is not possible, the same precision will be attainable by increasing the number of groups included in the sample. With correlation coefficient 0.2 and $5m$ groups, the same precision is attained as with correlation coefficient 0.9 and m groups. Correlation coefficient 0.5 and $2m$ groups give the same precision as correla-

tion coefficient 0.8 and m groups. The selection of the number of groups will, however, often be an important economic question, because the expense may be taken to be almost proportionate to the size of the sample and, therefore, in practice, when deciding upon the number of groups, consideration must be given not only to the more or less good correlation, but also to the degree of precision which the subject of the particular investigation requires.

The question of expense will not be less important in those cases where there is a possibility of using more than one control. In order to illustrate that the advantage of increasing the number of controls is in ordinary cases small, *Bowley* gives an example where the otherwise rather complicated calculations are very simple. This presupposes that the correlation coefficients between the quantity under investigation and the controls are all equal ($= r$) and that the correlation coefficients between the controls are also all equal ($= \rho$). In this case the standard deviation of error of the average found, when the number of controls is t , will vary with

$$\sqrt{1 - \frac{tr^2}{(t-1)\rho + 1}}.$$

If $r = \frac{2}{3}$ and $\rho = \frac{1}{2}$, which are values that might easily arise in practice, the reduction of the standard deviation of error which is obtained by various combinations of the number of controls and the number of groups will appear from the following table:—

| | | | | <i>Number of Groups.</i> | | |
|--------|-----|-----|-----|--------------------------|------|------|
| t — | | | | m | $2m$ | $3m$ |
| 1 ... | ... | ... | ... | 0.75 | 0.53 | 0.43 |
| 2 ... | ... | ... | ... | 0.64 | 0.45 | 0.37 |
| 3 ... | ... | ... | ... | 0.58 | 0.41 | 0.33 |
| 4 ... | ... | ... | ... | 0.54 | 0.38 | 0.31 |
| 5 ... | ... | ... | ... | 0.51 | 0.36 | 0.29 |
| 6 ... | ... | ... | ... | 0.49 | 0.35 | 0.28 |
| 7 ... | ... | ... | ... | 0.47 | 0.33 | 0.27 |
| 8 ... | ... | ... | ... | 0.46 | 0.32 | 0.26 |
| 9 ... | ... | ... | ... | 0.45 | 0.32 | 0.26 |
| 10 ... | ... | ... | ... | 0.44 | 0.31 | 0.25 |

From this it will be seen that, under the aforementioned pre-suppositions, the same precision is attained by increasing the number of controls from 1 to 5 as by doubling the number of groups, and that an increase of the number of controls from 1 to 10 gives the same precision as a three-fold increase of the number of groups.

As already stated, in making the decision as to the number of groups and controls careful attention ought to be paid to the twofold consideration of precision and economy. It should be taken into consideration that whilst it may be justifiable to make great sacrifices

of time, labour, and money in order to attain the greatest possible precision when the precision is not measurable, the position is otherwise when, as is the case here, it is possible to indicate the limits of uncertainty. The degree of precision demanded in each case depends, of course, upon the nature and purpose of the investigation, and it is absurd to go to expense for the purpose of attaining a precision which in the particular case is unnecessary.

The question of the selection of the number of controls has, however, an aspect which has not yet been touched upon.

It has hitherto been presupposed that the problem in hand was of a nature as simple as the finding of the value of a single average or proportion in the universe. It is this problem—and no other—at which *Bowley's* formula aims; it gives the standard deviation of error of the particular figure it is sought to determine, or of a number of ratios, if it is a question of distribution in grades. In showing that comparatively little is obtained by increasing the number of controls beyond rather narrow limits, this must, therefore, be understood with the above-mentioned presupposition in mind. But in practical statistics the problem will often be much more complex. I may perhaps refer as an example to the Danish Agricultural Census of 1923, in which extensive use was made of purposive selection.*

In that census very detailed information was obtained for every single farm as to the area and its utilization, the stock of cattle, the number of labourers employed on the farm, the farmer's participation in different co-operative societies, etc. After a summary count had been made of the various columns for each parish, the investigation was carried further by combining the information from the various farms in different ways. Thus in this second section of the investigation merely a representative part of the material was worked up in order to save time and money.

It was determined to make the size of the representative sample about 20 per cent. of the whole, which means that the sample was to form about 20 per cent. also in each of the country's 22 counties. In selecting the sample the procedure was as follows:—

For each of the 1,300 parishes the number of cows per 100 hectares of farm area was first calculated, and the parishes were arranged according to these ratios in each of the 22 counties. In this order the parishes in each county were divided into groups of 5 parishes, and from each of these groups was selected the parish whose agricultural area most nearly amounted to one-fifth of the total agricultural area of the group. In some cases, where the

* Cf. *Adolph Jensen*: "The Representative Method in Practice," *Bulletin de l'Institut International de Statistique*, Tome XXII, 1^{re} livraison, p. 420 *seqq.*, from which the following seven paragraphs are quoted.

parishes varied greatly in extent, the material was adapted by adding two parishes together or, conversely, dividing a large parish.

The parishes thus selected were now drawn on a map, in order to examine whether the various parts of the county were fairly equally represented. Where this was not the case it was sought, by exchanging the selected parishes with others where the number of cows per 100 hectares of agricultural area was about the same, to bring about the desired equal geographic representation.

This preliminary sample was now, in each county, tested with regard to the following factors: 1. Number of farms; 2. Total agricultural area; 3. Grain area; 4. Rootcrop area; 5. Grazing area; 6. Meadow area; 7. Number of horses; 8. Number of milch cows; 9. Total number of cattle; 10. Number of pigs: it being noted whether the sample, with regard to these various factors, represented approximately one-fifth of the whole county. Where considerable differences were found in one or more respects, an examination was made to ascertain from which parish or parishes each of the differences originated, and thereafter an attempt was made to remove the differences, as far as possible, by exchanging these parishes with others where the proportion between the size of the agricultural area and the number of cows was the same. Furthermore, care was taken that the geographic representation was not too much disturbed.

Where the figures for a county in some respect or other were especially small, it is natural that the incidental circumstances in the selection of parishes might have a far-reaching effect (this is, for instance, true in regard to some counties with respect to the meadow area). In such cases the demands as to the representative character of the sample had naturally to be somewhat modified.

To what degree it was possible to compile a representative sample will appear from the table below:—

| | Percentage of Totality. | | |
|--------------------------------|----------------------------|------------------------|------------------------|
| | Sample for the Islands. | Sample for Jutland. | Sample for Denmark. |
| Number of farms | 20.8 | 20.7 | 20.8 |
| Total agricultural area | 20.6 | 20.9 | 20.8 |
| Grain area | 21.0 | 20.7 | 20.8 |
| Root-crop area | 21.0 | 20.8 | 20.9 |
| Grazing area | 21.1 | 20.8 | 20.9 |
| Meadow area | 19.5 | 20.9 | 20.7 |
| Number of horses | 21.0 | 20.6 | 20.8 |
| Number of milch cows | 20.8 | 20.8 | 20.8 |
| Total number of cattle | 20.8 | 20.9 | 20.9 |
| Number of pigs | 20.8 | 21.1 | 21.0 |

Each one of the subjects of enquiry might, perhaps, have been

| | Universe. | Sample. |
|---|-----------|---------|
| Number of groups (parishes) | 1,300 | 260 |
| Number of farms | 195,812 | 10,717 |
| Agricultural area (hectares) | 3,075,710 | 641,466 |
| Average size of farms | 157 | 158 |
| Hectares per <i>tönde hartkorn</i> * | 7.9 | 7.9 |
| Utilization of agricultural area per 1,000 hectares : | | |
| Grain area | 407 | 407 |
| Root-crop area | 149 | 150 |
| Grazing area | 250 | 248 |
| Fallow | 34 | 34 |
| Livestock per 1,000 hectares : | | |
| Number of horses | 169 | 167 |
| Number of milch cows | 426 | 425 |
| Total number of cattle | 805 | 805 |
| Number of sheep | 121 | 119 |
| Number of pigs | 891 | 896 |
| Composition of the horse stock : | | |
| Stallions | 0.8 % | 0.8 % |
| Geldings, 3-6 years | 14.7 " | 15.3 " |
| " 6-10 " | 13.3 " | 12.1 " |
| " 10 years and over | 10.5 " | 10.0 " |
| Mares, 3-6 years | 15.0 " | 15.4 " |
| " 6-10 " | 16.7 " | 16.5 " |
| " 10 years and over | 10.3 " | 10.1 " |
| Colts, 1-2 years | 7.0 " | 7.4 " |
| " 2-3 " | 5.7 " | 6.0 " |
| Foals, less than 1 year | 6.0 " | 6.4 " |
| Composition of the cattle stock : | | |
| Bulls, 1-2 years | 100.0 " | 100.0 " |
| " 2 years and over | 1.7 % | 1.7 % |
| Bullocks, 1 year and over | 0.6 " | 0.6 " |
| Milch cows, less than 6 years | 3.2 " | 3.2 " |
| " 6-10 years | 20.3 " | 28.0 " |
| " 10 years and over | 20.7 " | 20.0 " |
| Heifers | 3.1 " | 3.1 " |
| Calves, less than 1 year | 15.9 " | 16.0 " |
| | 25.6 " | 25.6 " |
| Distribution of farms according to area : | | |
| 0.55 to 1.7 hectares | 100.0 " | 100.0 " |
| 0.55 to 1.5 " | 5.3 % | 1.9 % |
| 1.7 to 3.3 " | 0.6 " | 0.6 " |
| 1.5 to 3.0 " | 12.0 " | 11.5 " |
| 3.3 to 5.0 " | 11.1 " | 11.8 " |
| 3.0 to 5.0 " | 11.1 " | 11.8 " |
| 5 to 10 " | 21.9 " | 22.6 " |
| 10 to 15 " | 13.2 " | 13.1 " |
| 15 to 30 " | 21.9 " | 22.4 " |
| 30 to 60 " | 11.6 " | 11.0 " |
| 60 to 120 " | 2.3 " | 2.0 " |
| 120 to 240 " | 0.5 " | 0.4 " |
| 240 hectares and over | 0.2 " | 0.2 " |
| | 100.0 " | 100.0 " |

* The "*tönde hartkorn*" is a quality measure for the soil.

CORRIGENDUM.

Part IV, 1928, p. 546 ; fourth line of table, for 157 and 158 read 157 and 158.

investigated with sufficient certainty on the basis of a sample selected by the use of one or two controls, but the same controls would not have been equally applicable to all the subjects of the investigation, and, therefore, it was advisable to use a greater number of controls. It is clear that the greater the number of controls included, the nearer does one approach the ideal sample which in all respects gives an exact reflection of the universe. The sample that was selected in this investigation was selected with regard to 10 various factors, and it succeeded so well that the sample, with regard to all 10 factors, contained very nearly 21 per cent. of the universe. It will be seen from the following table to what degree the sample reflected the universe with regard to a number of points which were of importance to the subject of the investigation.

ON THE NORMAL CORRELATION FUNCTION AS AN APPROXIMATION
TO THE DISTRIBUTION OF PAIRED DRAWINGS.

By E. C. RHODES, D.Sc.

ONE of the methods of deriving the equation to the frequency curve

$y = \frac{1}{\sqrt{2\pi}\sigma} e^{-\frac{1}{2}\frac{x^2}{\sigma^2}}$ is to consider the chance $\frac{n!}{r!n-r!} p^r q^{n-r}$ of obtain-

ing in a sample of n , drawn from an infinite population of objects in two classes (successes and failures), r successes where p is the chance of a success at any individual drawing. The procedure is to get an approximation to this chance, where n , np , nq are assumed large, and r is not too far removed from np . (See, for example, A. L. Bowley, *Elements of Statistics*.) If we start with an expression representing the chance of two events occurring together we should similarly be able to derive the equation to the normal correlation surface.

Let us then write down the chance that, from a finite population of size N containing P individuals in one class (successes) and Q individuals in another alternate class (failures) ($N = P + Q$), a sample without replacement of size n is drawn with s successes, and another sample size ($n' - n$) is drawn with ($s' - s$) successes. Then we can regard this chance as that of drawing two samples, n with s successes and n' with s' successes, which contains as a part of itself the first sample. There will thus be a relationship between the number of successes in the two samples. The chance is

$$C_{s,s'} = \frac{n! P! Q! N - n'! n' - n!}{s! n - s! s' - s! n' - n - s' | s! P - s'! (Q - n' + s'! N!}^1$$

and to this I propose to get an approximation valid under certain conditions as to the size of the various quantities involved.

In order to do this it is preferable to write—

$$C_{s,s'} = \frac{n!}{s!n - s!} p^s q^{n-s} \cdot \frac{n' - n!}{s' - s!n' - n - s' + s!} p^{s'-s} q^{n'-n-s'+s},$$

$$\frac{N - n!}{P - s'!Q - n' + s'!} p^{P-s'} q^{Q-n'+s'} \frac{P!Q!}{N!} p^{-P} q^{-Q},$$

where $p = \frac{P}{N}$, $q = \frac{Q}{N}$.

Then if we write $s = x + np$, $s' = y + n'p$; $s' - s = y - x + (n' - n)p$, $P - s' = (N - n')p - y$, and we have from the well-known approximation

$$\frac{n!}{r! n - r!} p^r q^{n-r} = \frac{1}{\sqrt{2\pi}} \frac{1}{\sqrt{mpq}} e^{-\frac{1}{2} \frac{(r - mp)^2}{mpq}},$$

where terms of order $\frac{1}{\sqrt{n}}$, $\frac{1}{\sqrt{mp}}$, $\frac{1}{\sqrt{mq}}$ are neglected as small;

$$C_{ss'} = \frac{1}{\sqrt{2\pi}} \frac{1}{\sqrt{npq}} e^{-\frac{1}{2} \frac{x^2}{npq}} \frac{1}{\sqrt{2\pi}} \frac{1}{\sqrt{(n' - n)pq}} e^{-\frac{1}{2} \frac{(y - x)^2}{(n' - n)pq}} \\ \times \frac{1}{\sqrt{2\pi}} \frac{1}{\sqrt{(N - n')pq}} e^{-\frac{1}{2} \frac{y^2}{(N - n')pq}} \cdot \sqrt{2\pi} \sqrt{pqN}$$

where we are assuming N , P , Q , n , n' large so that terms of order

$\frac{1}{\sqrt{n}}$, $\frac{1}{\sqrt{n' - n}}$, $\frac{1}{\sqrt{N - n'}}$, $\frac{1}{\sqrt{np}}$, etc., are negligible.

$$\text{This gives } C_{ss'} = \frac{1}{2\pi pq \sqrt{n(n' - n) \frac{(N - n')}{N}}} e^{-\frac{1}{2} \left(\frac{x^2}{npq} + \frac{(y - x)^2}{(n' - n)pq} + \frac{y^2}{(N - n')pq} \right)}.$$

This can be written in the form

$$\frac{1}{2\pi \sqrt{npq} \frac{N - n}{N} \cdot n'pq \frac{N - n'}{N} \cdot \frac{N(n' - n)}{n'(N - n)}} \\ \times e^{-\frac{1}{2} \frac{N(n' - n)}{n'(N - n)} \left\{ \frac{x^2}{npq \frac{N - n}{N}} + \frac{2xy \sqrt{\frac{n(N - n')}{n'(N - n)}}}{\sqrt{npq \frac{N - n}{N} \cdot n'pq \frac{N - n'}{N}}} + \frac{y^2}{n'pq \frac{N - n'}{N}} \right\}}$$

after simplification. If we call $npq \frac{N - n}{N} = \sigma^2$, $n'pq \frac{N - n'}{N} = \sigma'^2$

and

$$\sqrt{\frac{n(N - n')}{n'(N - n)}} = r$$

$$\text{we get } C_{ss'} = \frac{1}{2\pi \sigma \sigma' \sqrt{1 - r^2}} e^{-\frac{1}{2(1 - r^2)} \left(\sigma^2 - 2r \frac{xy}{\sigma \sigma'} + \frac{y'^2}{\sigma'^2} \right)}.$$

We may point out that if the original form of $C_{ss'}$ is considered for various s , s' we can find the standard deviations of s , s' and the coefficient of correlation between them and get the well-known

results:—the standard deviations are $\sqrt{npq \frac{N-n}{N-1}}$, $\sqrt{n'p'q' \frac{N-n'}{N-1}}$

and the coefficient of correlation is $\sqrt{\frac{n(N-n')}{n'(N-n)}}$. Thus we see that

the r of the formula is the coefficient of correlation of the original variables in the simple chance problem, and to our degree of approximation, the σ, σ' of our formula are the standard deviations of the original variables s, s' .

REPORT OF THE COUNCIL

For the FINANCIAL YEAR ended December 31, 1927, and for the SESSIONAL YEAR ending June 19, 1928, presented at the NINETY-FOURTH ANNUAL GENERAL MEETING of the ROYAL STATISTICAL SOCIETY, held in the Hall of the Royal Society of Arts, John Street, Adelphi, W.C. 2, on June 19, 1928.

THE Council have the honour to submit their Ninety-fourth Annual Report.

The roll of Fellows on December 31 last, as compared with the average of the previous ten years, was as follows :—

| Particulars. | 1927. | Average of the Previous Ten Years. |
|--|-------|------------------------------------|
| Number of Fellows on December 31 | 1,074 | 919 |
| Life Fellows included in the above | 199 | 183 |
| Number lost by death, withdrawal, or default . | 42 | 48 |
| New Fellows elected | 62 | 77 |

Since January 1 last, 34 new Fellows have been elected or restored to the list, and the Society has lost 42 by death, resignation, or default, so that the number on the list, excluding Honorary Fellows, on June 19, 1928, is 1,066, compared with 1,056 on June 21 last year.

Since June, 1927, the Society has lost by death the under-mentioned Fellows :—

| | Date of Election. |
|---|-------------------|
| Anstice, W. H. | 1925 |
| <i>c d p</i> Eversley, The Rt. Hon. Lord | 1877 |
| Ghosh, Rai Bahadur Devendra Nath, B.A. | 1909 |
| <i>c d p</i> Hamilton, The Rt. Hon. Lord George F., G.C.S.I. | 1873 |
| Hatch, Sir Ernest F. G., Bart., K.B.E. | 1911 |
| Lavington, Frederick | 1912 |
| Llewelyn, Sir John T. D., Bart. | 1892 |
| <i>d p</i> Schooling, J. Holt | 1891 |
| Shackel, Thomas W. | 1914 |

c Served on Council.

d Donor to the Library.

p Contributor to Proceedings of the Society.

Honorary Fellow.

Yves-Guyot 1908

The record of the deaths, eight in number, which occurred during the past session, includes the honoured names of two past Presidents, Lord George Hamilton and Lord Eversley, both of whom joined the Society in the 'seventies of last century and were statesmen as well as statisticians.

Lord Eversley was elected a Fellow (as Mr. G. J. Shaw-Lefevre, M.P.) in 1877, and became President in the same year. In his inaugural Address he discussed the methods and applications of statistics; a second Address delivered in 1878 was devoted to the "Depression of Trade." His remaining contribution to the *Journal*, made after an interval of nearly thirty years, was a paper on "The Decline in the Number of Agricultural Labourers in Great Britain" (1907); but he always remained in close touch with the Society, frequently sending for information and borrowing books from the Library up to within a few weeks of his death last April, at the age of ninety-six.

Lord George Hamilton was elected to the Society in 1873, served on the Council during the periods 1894–96 and 1905–07, and was twice President: the first time in the years 1910–12, and the second in 1915–16, after Lord Welby's death during his term of office. He contributed two papers to the Proceedings of the Society, namely: "Ocean Highways: their bearing on the Food and Wages of Great Britain" (1894), and "A Statistical Survey of the Problem of Pauperism" (1910), the latter being his Presidential Address. It will be remembered that Lord George presided at the dinner to the Dominions statisticians given by the Society on the occasion of the Conference in 1920, and also at the Society's meeting on the same day when Sir George Knibbs's paper was read.

The Council has also to deplore the death, at the age of eighty-four, of M. Yves-Guyot, the well-known French economist, who joined the Society in 1887 and was elected an Honorary Fellow in 1908. In 1903 he contributed a paper on "The Sugar Industry on the Continent," for which he was awarded a Guy Medal in Silver.

Obituary notices of these eminent Fellows were published in Parts I, III, and II, respectively, of this year's *Journal*.

Since June 1927, the following new Fellows have been elected :—

| | |
|--|--|
| Beldham, Henry Bailey Bryant, A.S.A.A. | Jacob, Sydney Montague. Johnston, Walter Lindsay. |
| Brand, Agnes May. | Kemp, Hubert Richmond. |
| Breckin, Rowland Rayner. | Kiernan, Thomas Joseph. |
| Carson, Robert, A.L.A.A. | Lloyd, James Henry. |
| Chamberlain, John Alfred. | Lumley, Edward Adrian. |
| Chu, Yetsun Carson. | Lund, Percival Arthur. |
| Clay, Charles Nightingale, B.Sc., A.I.C. | Marshall, Herbert, B.A. |
| Cole, George Douglas Howard. | Martin, Charles Henry. |
| Coles, George William Thomas. | Maudling, Reginald George, F.I.A. |
| Davies, William Howard, B.Com., F.C.W.A. | Mitchell, George Abercromby. |
| Donavon-Hickie, Louis. | Newman, Tom Seth. |
| Douglas, Jessie Iris. | Paull, Thomas Egginton. |
| Dudley, Francis John. | Pritchard, Edgar Leslie. |
| Ellis, Cecil A., A.S.A.A. | Quinton, Reginald William Anthony. |
| Erulkar, David Solomon, B.A. | Reynolds, Reginald Carey. |
| Fernandes, Aloysius Martin Sylvester, B.A., B.Sc. | Ridley, George. |
| Freeheville, George, M.A., B.Sc. | Rodgers, Herbert, A.S.A.A. |
| Freeman, Horace Sidney. | Rooke, Charles Eustace. |
| Gandhi, Manmohan Parreshottam, M.A. | Ryan, John. |
| George, Cecil Oswald. | Silvester, Reginald Frederick. |
| Golding, Cecil Edward, LL.D. | Smith, William Millar. |
| Greene, Christian Augustine Everard. | Southam, Hubert Basil. |
| Hargreaves, Eric Lyde. | Staples, Ronald. |
| Hoosain, Mohamed Shaik. | Stewart, Walter W. |
| Hughes, Charles Garland. | Tomlin, Walter Linford. |
| Jackson, Prof. Gilbert. | Upham, James Percival. |
| | Walker, Charles Frederick Thompson. |
| | Whale, Philip Barrett. |
| | Williams, Leyshon Richard. |
| | Woodward, Owen Ernest. |

Representatives of Corporate Bodies :—

| | |
|------------------------|---|
| Bourdillon, F. B. | <i>representing</i> The Royal Institute of International Affairs. |
| Cadbury, Lawrence John | <i>representing</i> Messrs. Cadbury Brothers, Ltd. |
| Cohen, Percy | <i>representing</i> The Conservative and Unionist Central Office (in place of P. G. Cambray). |
| Hughes, H. G. | <i>representing</i> The Cotton Trade Statistical Bureau. |
| Rowley, Cecil Arthur | <i>representing</i> The Westminster Bank, Ltd. |

During the Session 1927–28, 62 new Fellows were elected (one in place of a corporate representative who resigned), and the total number of Ordinary Fellows is now 1,066.

The financial position of the Society is shown in the customary statements given as appendices. This year the auditors have made certain changes in setting out the figures, so that the difference

between the sums actually received and paid out during the year is brought out clearly; and for 1927 it appears as an “excess of expenditure over receipts” of £1.45. As explained, however, in the Auditors’ Report, the Society’s balances in hand at the end of 1926 were more than sufficient to cover the difference, and the figures show that while the income was the same as that of the previous year the outgoings were slightly less. The apparent deficit therefore means that although the Society pays its way, it has not for some years past been able to effect any savings; and, in consequence, any extraordinary expenditure which might become necessary or desirable would bring the Society face to face with difficulty. As is known to Fellows, it is anticipated that a considerable amount of extra expenditure may be needed when the Society’s tenancy of its present house comes to an end, and the Council strongly desires to see an increase in the Society’s income. It is manifestly impossible to effect any decrease in expenditure without detriment to the Society’s work.

In the meantime, it is satisfactory to see that the income from the *Journal* sales rises from year to year, so also does that from Fellows’ subscriptions, but to a lesser degree, since the number elected has been diminishing of late and was lower this year than in any since 1918. The gains still out-balance the losses and the total Fellowship continues to grow.

The Ordinary Meetings have been held in each month of the Session, and the papers read before the Society were as follows :—

1927.

I.—November 15 ... VIGOR, H. D. Official Crop Estimates in England.

II.—December 20 ... CONNOR, L. R. On Certain Aspects of the Distribution of Income in the United Kingdom in 1913 and 1924.

1928.

III.—January 17 ... DANIELS, PROF. G. W. R. and J. JEWKES. The Post-War Depression in the Lancashire Cotton Industry.

IV.—February 21 ... STEVENSON, DR. T. H. G., C.B.E., M.D. Vital Statistics of Wealth and Poverty.

V.—March 20 ... MACROSTY, HENRY W., O.B.E. Trade and the Gold Standard.

VI.—April 17 ... EDGE, MAJOR P. GRANVILLE. Differences in Registration Systems of Various Countries.

VII.—May 15 ... JONES, D. CARADOG, M.A. Cost of Living of a Sample of Middle-Class Families.

VIII.—June 19 ... HILTON, JOHN. Enquiry by Sample: some further results.

The Council have awarded a Guy Medal in silver to Miss Ethel May Newbold for her paper "Practical Applications of the Statistics of Repeated Events particularly to Industrial Accidents," read before the Society on April 26, 1927.

The proposal that supplementary meetings of a less formal character than the Ordinary Meetings of the Society should be held, in the interests of the younger statisticians, has now developed into a definite plan for the organization of additional Meetings for study and discussion. Meetings of those interested were held on May 19 and June 4, with Professor Bowley in the Chair. It is hoped that as a result, such meetings will be held regularly next session, and that they will prove useful in furthering the scientific study of statistics, especially as affording a medium of co-operation between workers in the same field, and an opportunity of calling attention to new developments in method, or to results obtained by workers in various parts of the world.

The Council has undertaken the publication of a monograph by Professor A. L. Bowley on the late Professor Edgeworth's mathematical statistical writings. The book will be issued shortly.

As readers of the *Journal* will be aware, the Society has twice had occasion to congratulate its Honorary Secretary, Professor Major Greenwood, first on the award to him by the President and Council of the Royal Society, last November, of the Buchanan Medal "for statistical researches and other distinguished work in relation to public health," and in May, by his election as a Fellow of the Royal Society. It is only a few years since the latter honour was conferred on Mr. Udny Yule, and this Society must, in addition to feeling very proud of these distinguished Fellows, be extremely gratified at such recognition by the Royal Society of achievements in the science of statistics.

The appointment of Sir Josiah Stamp as a Director of the Bank of England should be another source of satisfaction to the Society, not only as a distinction conferred on one of its own officers, but also as rendering available in the counsels of the Bank an economic and financial experience which has been both varied and extensive to an unusual degree.

The Frances Wood Memorial Prize was not awarded in 1927 as none of the essays sent in were adjudged to reach a sufficiently high standard. The prize is being offered again in 1928. As already announced in the *Journal*, the award is for an essay dealing with some aspect of working-class life treated on statistical lines.

The number of additions to the Library and the statistics of its use by Fellows and others will be found in Appendix C. The monthly average of volumes lent during the year ending May 31, 1928, was 156, and that of borrowers 62.

The Fellows named below (nominated in accordance with By-law 14) are recommended for election as President, Council and Officers of the Society for the Session 1928–29 :—

President.

A. W. Flux, C.B.

Council.

| | |
|------------------------------------|----------------------------------|
| James Bonar, LL.D. | *John Hilton. |
| Professor A. L. Bowley, F.B.A. | Alfred Hoare. |
| *A. R. Burnett-Hurst. | Robert Holland-Martin, C.B. |
| S. Chapman. | Leon Isserlis, D.Sc. |
| W. H. Coates. | Professor J. H. Jones. |
| Clara E. Collet. | H. W. Macrosty, O.B.E. |
| *Lewis R. Connor. | Ethel M. Newbold. |
| Norman E. Crump. | C. P. Sanger. |
| *W. Palin Elderton, C.B.E., F.I.A. | *E. C. Snow, D.Sc. |
| *Barnard Ellinger, C.B.E. | J. Calvert Spensley, O.B.E. |
| Dorothy P. Etlinger. | Sir J. C. Stamp, G.B.E., D.Sc. |
| Major Greenwood, F.R.S. | Harold D. Vigor. |
| Sir E. J. Harper. | Sir A. W. Watson, K.C.B., F.I.A. |
| R. G. Hawtrey. | A. D. Webb. |
| David Heron, D.Sc. | D. R. Wilson. |

Those marked * are proposed as new Members of Council.

Honorary Treasurer.

Robert Holland-Martin, C.B.

Honorary Secretaries.

| | |
|--------------------------------|------------------------|
| M. Greenwood, F.R.S. | H. W. Macrosty, O.B.E. |
| Sir J. C. Stamp, G.B.E., D.Sc. | |

Honorary Foreign Secretary.

M. Greenwood, F.R.S.

The abstract of the Treasurer's account of receipts and payments and the estimate of assets and liabilities on December 31, 1927, together with the report of the Auditors on the accounts for the year 1927, are appended.

Signed on behalf of the Council,

D'ABERNON,

President.

| | |
|---------------|----------------------------|
| A. W. FLUX, | } <i>Hon. Secretaries.</i> |
| M. GREENWOOD, | |
| J. C. STAMP, | |

A.—(v) REPORT OF THE AUDITORS FOR 1927.

The Auditors appointed to examine the Treasurer's Accounts for the Year 1927,

“REPORT :—

“*That they have compared the Entries in the Books with the Vouchers for the same, from January 1 to December 31, 1927, and find them correct, showing that the net RECEIPTS, excluding life compositions £84. were £2,917 9s. 3d., and the PAYMENTS were £3,063 2s. 3d., leaving a deficit of £145 13s. The deficit was met out of the cash in hand and on deposit £210 9s. 8d., and after crediting the £84 cash provided by life compositions received during the year, the cash balance in hand amounted to £148 16s. 8d. (£294 9s. 8d. less £145 13s.). A Life Composition Fund liability has been shown on the Balance Sheet amounting to £1071, being the £987 earmarked at the end of 1926 increased by the £84 received in 1927.*

“*They have also had laid before them an Estimate of the Assets and Liabilities of the Society at the same date, the FORMER amounting to £8610 1s. 8d., and the LATTER to £1372 5s. 4d. (including the Life Composition Fund), leaving an excess of Assets over Liabilities of £7237 16s. 4d., EXCLUSIVE of (1) Books in the Library; (2) Journals, &c., in Stock; and (3) Pictures, Furniture and Fictures.*

“*They have VERIFIED the Investments of the Society's General Funds (£2,236 11s. 3d. Consols, £966 3½ per cent. Conversion Loan, £666 L. & N.E.R. 4 per cent. Second Preference Stock, and £266 L. & N.E.R. 5 per cent. Preferred Ordinary Stock); the Guy Bequest (£10,527 12s. 3d. Consols); the Building Fund (£918 3s. 10d. Metropolitan Consolidated 3½ per cent. Stock); the Frances Wood Memorial Fund (£500 4 per cent. L.M. & Scottish Railway Preference Stock); and also the Bankers' balance of £144 0s. 11d.; all of which were examined and found correct. The market prices at December 31, 1927, have been adopted in valuing the Society's investments.*

“*They further find that at the end of the year 1926 the number of FELLOWS on the list was 1,054, which number was reduced in the course of the year 1927 to the extent of 42, by Death, Resignation, or Default; and that 62 new Fellows were elected, leaving on the list on December 31, 1927, 1,074 Fellows of the Society, of whom 199 were compounders.*

| | | |
|----------|------------------|---------------------|
| (Signed) | “ M. S. BIRKETT, | } <i>Auditors.”</i> |
| | “ P. G. BROWN, | |
| | “ W. H. COATES, | |

“*March 15, 1928.”*

APPENDICES TO

A.—(i) ABSTRACT of RECEIPTS and PAYMENTS

| Year 1926. | | RECEIPTS. | Year 1927. | |
|------------|--|---|------------|--|
| 55 18 0 | | { Dividends on £2,236 11s. 3d., Consols, Account A } | 55 18 0 | |
| 263 3 8 | | { Dividends on £10,527 12s. 3d., Consols, Account B } | 263 3 8 | |
| 26 11 11 | | { Dividends on £666 Pref. and £260 Ord. Stock, L.N.E. Ry. } | 10 18 6 | |
| 38 16 2 | | { Dividends on £966 Conversion Loan ... } | 33 10 2 | |
| 10 14 2 | | Interest on deposit ... | 12 1 9 | |
| 395 3 11 | | | 375 18 1 | |
| 1,451 2 0 | | Annual Subscriptions:— | | |
| 113 8 0 | | 721 for 1927 ... | 1,514 2 0 | |
| 54 12 0 | | 49 Arrears ... | 102 18 0 | |
| | | 23 in Advance ... | 48 6 0 | |
| 1,619 2 0 | | | 1,665 6 0 | |
| 780 7 9 | | Journal sales ... | 791 10 2 | |
| 9 0 0 | | Journal advertisements. | 11 5 0 | |
| 11 2 5 | | Catalogue and Index sales ... | 5 11 3 | |
| 800 10 2 | | | 808 6 5 | |
| 9 4 8 | | Repayment of Income Tax due to Society, 1924–25 ... | — | |
| 90 10 6 | | Royal Economic Society and others, for use of rooms ... | 61 1 0 | |
| 10 0 | | Miscellaneous ... | 6 17 9 | |
| £2,915 1 3 | | Total receipts ... | £2,917 9 3 | |
| 195 3 6 | | Excess of expenditure over receipts | 145 13 0 | |
| £3,110 4 9 | | | £3,063 2 3 | |

“ March 15, 1928.”

ANNUAL REPORT.

for the YEAR ended DECEMBER 31, 1927.

| | | | PAYMENTS. | | | | | |
|------------|----|----|---------------------------|--|--|------------|----|------------|
| Year 1926. | | | | | | Year 1927. | | |
| £ | s. | d. | | | | £ | s. | d. |
| 380 | 0 | 0 | Rent and Taxes :— | | | 380 | 0 | 0 |
| 25 | 14 | 6 | Rent | | | 29 | 8 | 0 |
| 3 | 3 | 4 | Hire of hall | | | 3 | 3 | 4 |
| | | | Land tax | | | | | |
| 408 | 17 | 10 | | | | | | 412 11 4 |
| 65 | 6 | 5 | Fuel, Light and Water ... | | | 91 | 0 | 10 |
| 30 | 10 | 9 | { Insurance, Fire and | | | 13 | 19 | 3 |
| | | | { Accident | | | | | |
| 9 | 0 | 11 | { Furniture and equip- | | | — | | |
| 55 | 12 | 9 | { ment | | | 18 | 18 | 0 |
| | | | Repairs | | | | | |
| 160 | 10 | 10 | | | | | | 123 18 1 |
| 908 | 0 | 11 | Salaries and Wages ... | | | 809 | 17 | 11 |
| 83 | 8 | 4 | Pension | | | 91 | 0 | 0 |
| 65 | 5 | 6 | Housekeeping expenses... | | | 63 | 8 | 2 |
| 1,056 | 14 | 9 | | | | | | 964 6 1 |
| | | | Journal :— | | | | | |
| 796 | 18 | 8 | Printing | | | 765 | 15 | 5 |
| 173 | 1 | 11 | Paper | | | 198 | 14 | 6 |
| 20 | 15 | 6 | Reporting | | | 22 | 15 | 6 |
| 56 | 5 | 0 | Literary services ... | | | 51 | 2 | 6 |
| 19 | 2 | 3 | { Re-purchase of scarce | | | 57 | 2 | 3 |
| | | | { parts | | | | | |
| 1,066 | 3 | 4 | | | | | | 1,095 10 2 |
| | | | Library :— | | | | | |
| 49 | 13 | 10 | Books | | | 37 | 9 | 2 |
| 48 | 16 | 0 | Binding | | | 81 | 19 | 0 |
| 98 | 9 | 10 | | | | | | 119 8 2 |
| 24 | 11 | 0 | Advertising | | | 21 | 2 | 3 |
| 100 | 6 | 3 | { Stationery and Miscel- | | | 157 | 17 | 2 |
| 32 | 7 | 6 | { laneous Printing | | | | | |
| 138 | 18 | 6 | Printing of Index ... | | | 141 | 14 | 9 |
| 14 | 17 | 2 | { Postage, including | | | 17 | 0 | 6 |
| | | | { Journal | | | 2 | 5 | 0 |
| 8 | 7 | 9 | Telephone | | | 7 | 8 | 9 |
| | | | Guy Medal | | | | | |
| 319 | 8 | 2 | Miscellaneous | | | | | 347 8 5 |
| | | | | | | | | |
| £3,110 | 4 | 9 | Total expenditure | | | £3,063 | 2 | 3 |

(Signed)

"M. S. BIRKETT, P. G. BROWN, W. H. COATES, *Auditors.*"

A.—(ii) ESTIMATE of ASSETS and

| Year 1926. | | | | LIABILITIES. | | Year 1927. | | | |
|------------|----|----|---|--------------|--|------------|-----|----|------------|
| £ | s. | d. | | | | £ | s. | d. | £ s. d. |
| 49 | 3 | 5 | { Miscellaneous Ac- counts, as per list ... } | | | 145 | 5 | 4 | |
| 54 | 12 | 0 | { Subscriptions received in advance (23) ... } | | | 48 | 6 | 0 | |
| 112 | 19 | 0 | { Journal subscriptions received in advance } | | | 107 | 14 | 0 | |
| 216 | 14 | 5 | | | | | | | 301 5 4 |
| 987 | 0 | 0 | Life Composition Fund | | | ... | ... | | 1,071 0 0 |
| 7,264 | 15 | 3 | { Balance in favour of the Society (ex- clusive of (1) Books in Library; (2) Journals in Stock; and (3) Pictures, Furniture and Fixtures ... ' ... } | | | | | | 7,237 16 4 |

£8,468 9 8

£8,610 1 8

A.—(iii) BUILDING FUND (ESTABLISHED *July* 10, 1873) :

This Fund is invested in Metropolitan Consolidated £3 10s. per Cent. Stock, With the dividends received during 1927, additional Stock to the value total investment amounted to £918 3s. 10d. (Price, December 31, 1927,

A.—(iv) *The FRANCES WOOD MEMORIAL FUND* :

This Fund is invested in £500 4 per Cent. Preference Stock, London Midland and follows :—In hand at December 31, 1926, £35 5s. 0d ; Dividends received, in hand. (Price, December 31, 1927, £75.)

“ *March* 15, 1928.”

LIABILITIES on DECEMBER 31, 1927.

| Year 1926. | | | ASSETS. | | Year 1927. | | |
|---------------|----------|----------|--|-----|---------------|----------|-----------|
| £ | s. | d. | | | £ | s. | d. |
| 1,208 | 0 | 0 | { £2,236 11s. 3d. Con- | | 1,241 | 0 | 0 |
| | | | sols (General Fund). | | | | |
| | | | (Price, December 31, | | | | |
| | | | 1927, £55 10s.) say... | | | | |
| 5,685 | 0 | 0 | { £10,527 12s. 3d. Con- | | 5,843 | 0 | 0 |
| | | | sols (Guy Bequest). | | | | |
| | | | (Price, December 31, | | | | |
| | | | 1927, £55 10s.) say... | | | | |
| 732 | 0 | 0 | { £966 3½ per Cent. Con- | | 744 | 0 | 0 |
| | | | version Loan. Price, | | | | |
| | | | December 31, 1927, | | | | |
| | | | £77) say ... | | | | |
| 361 | 0 | 0 | { £666 4 per Cent. 2nd | | 431 | 0 | 0 |
| | | | Preference Stock, L. | | | | |
| | | | & N.E. Rly. (Price, | | | | |
| | | | December 31, 1927, | | | | |
| | | | £64 15s.) say ... | | | | |
| 136 | 0 | 0 | { £266 5 per Cent. Pro- | | 116 | 0 | 0 |
| | | | ferred Ordinary | | | | |
| | | | Stock, L. & N.E. | | | | |
| | | | Rly. (Price, De- | | | | |
| | | | cember 31, 1927, | | | | |
| | | | £43 10s.) say ... | | | | |
| 8,122 | 0 | 0 | | | - | - | 8,375 0 0 |
| | | | Cash Balances : | | | | |
| 57 | 3 | 0 | At Bank | 114 | 0 | 11 | |
| 3 | 6 | 8 | Petty cash | 4 | 15 | 9 | |
| 60 | 9 | 8 | | - | | | 148 16 8 |
| 150 | 0 | 0 | Deposit Balance | | | | . |
| 52 | 0 | 0 | Sundry debtors | | | | 2 5 0 |
| 84 | 0 | 0 | { Arrears of Subscriptions recoverable } | | | | 84 0 0 |
| | | | say 40 | | | | |
| <u>£8,468</u> | <u>9</u> | <u>8</u> | | | <u>£8,610</u> | <u>1</u> | <u>8</u> |

STATEMENT of the FUND on DECEMBER 31, 1927.

and on December 31, 1926, the Fund was represented by £888 19s. 10d. Stock. of £29 4s. 0d. was purchased. Accordingly, on December 31, 1927, the £97 5s.)

STATEMENT of the FUND on DECEMBER 31, 1927.

Scottish Railway. The position of the income of the Fund in 1927 was as £16, less expenses of printing, etc., £4 6s. 9d., making a total of £46 18s. 3d.

(Signed)

"M. S. BIRKETT, P. G. BROWN, W. H. COATES, *Auditors.*"

B.—Statement of the Condition of the Society in the last Twenty-five Years, 1903–1927.

| Year. | Number of Fellows on De- cember 31. | Number of Life Fellows included therein. | Losses during Year by Deaths, &c. | Gains by Election, &c., during Year | Receipts from | | | | | Payments ^a | | | Amount invested on December 31.1 | Year. |
|-------|--|--|-----------------------------------|-------------------------------------|----------------------------|-------------------------|------------------|----------------------|--------------------|-----------------------|-------------|------------|----------------------------------|-------------------|
| | | | | | Annual Subscrip- tions. | Com- posi- tions. | Journal Sales. | Invest- ments &c. | All Sources. | Total. | Of which | | | |
| | | | | | | | | | | | On Journal. | On Library | | |
| | | | | | | | | | | | | | | |
| 1903 | 939 | 174 | 49 | 56 | £ 1,517 | £ 84 | £ 293 | £ 151 | £ 2,045 | £ 1,875 | £ 593 | £ 91 | 1903 | 1903 |
| 1904 | 925 | 175 | 58 | 44 | 1,407 | 124 | 253 | 152 | 1,936 | 1,931 ¹ | 521 | 92 | 1904 | 1904 |
| 1905 | 911 | 178 | 59 | 45 | 1,465 | 168 | 220 | 220 | 2,073 | 2,074 ^m | 665 | 67 | 1905 | 1905 ^a |
| 1906 | 891 | 177 | 63 | 43 | 1,464 | 82 | 225 | 408 | 2,274 ^o | 1,888 | 645 | 95 | 1906 | 1906 |
| 1907 | 861 | 172 | 63 | 33 | 1,363 | 82 | 327 ^a | 408 | 2,180 | 2,401 ^p | 571 | 87 | 1907 | 1907 |
| 1908 | 855 | 170 | 46 | 40 | 1,339 | 84 | 254 | 494 ^r | 2,171 ^r | 2,428 ^a | 602 | 92 | 1908 | 1908 |
| 1909 | 825 | 167 | 82 | 52 | 1,307 | 84 | 273 | 396 | 2,060 | 2,369 | 641 | 99 | 1909 | 1909 |
| 1910 | 845 | 172 | 37 | 57 | 1,304 | 141 | 326 | 974 ^t | 2,746 ^t | 2,726 ^u | 803 | 74 | 1910 | 1910 |
| 1911 | 867 | 174 | 40 | 62 | 1,415 | 126 | 308 | 405 | 2,255 | 2,372 ^v | 721 | 104 | 1911 | 1911 |
| 1912 | 854 | 175 | 57 | 44 | 1,336 | 105 | 334 | 382 | 2,157 | 2,174 | 776 | 81 | 1912 | 1912 |
| 1913 | 846 | 174 | 61 | 53 | 1,331 | 84 | 294 | 399 | 2,108 | 2,058 | 671 | 79 | 1913 | 1913 |
| 1914 | 821 | 169 | 64 | 39 | 1,281 | 42 | 271 | 489 ^y | 2,083 | 2,319 ^x | 813 | 88 | 1914 | 1914 |
| 1915 | 772 | 163 | 61 | 12 | 1,243 | 63 | 268 | 351 | 1,925 | 1,803 | 448 | 40 | 1915 | 1915 |
| 1916 | 758 | 163 | 48 | 34 | 1,181 | 42 | 325 | 302 | 1,850 | 1,655 | 507 | 36 | 1916 | 1916 |
| 1917 | 757 | 161 | 41 | 40 | 1,186 | 52 | 311 | 305 | 1,854 | 1,732 ^x | 403 | 54 | 1917 | 1917 |
| 1918 | 761 | 167 | 43 | 47 | 1,132 | 222 | 305 | 459 | 2,118 | 1,900 ^z | 665 | 32 | 1918 | 1918 |
| 1919 | 796 | 172 | 56 | 91 | 1,297 | 273 | 603 | 286 | 2,459 | 2,784 ^z | 782 | 50 | 1919 | 1919 |
| 1920 | 882 | 180 | 37 | 123 | 1,373 | 250 | 730 | 291 | 2,739 | 2,838 | 951 | 99 | 1920 | 1920 |
| 1921 | 946 | 186 | 48 | 112 | 1,480 | * | 661 | 279 | 2,783 | 2,827 | 887 | 94 | 1921 | 1921 |
| 1922 | 969 | 187 | 48 | 71 | 1,499 | * | 688 | 345 | 3,009 | 3,388 ^t | 951 | 103 | 1922 | 1922 |
| 1923 | 996 | 195 | 39 | 66 | 1,476 | * | 738 | 387 | 2,856 | 2,940 | 853 | 107 | 1923 | 1923 |
| 1924 | 1,002 | 194 | 62 | 68 | 1,638 | * | 666 | 389 | 2,785 | 2,970 | 850 | 137 | 1924 | 1924 |
| 1925 | 1,030 | 195 | 51 | 79 | 1,611 | * | 806 | 398 | 2,860 | 2,962 | 872 | 116 | 1925 | 1925 |
| 1926 | 1,054 | 197 | 53 | 77 | 1,619 | * | 780 | 395 | 2,915 | 3,110 | 1,066 | 98 | 1926 | 1926 |
| 1927 | 1,074 | 199 | 42 | 62 | 1,665 | * | 791 | 376 | 2,917 | 3,063 | 1,095 | 119 | 1927 | 1927 |

¹ Includes purchase of Government stock.² Exclusive of Building Fund.^m Includes £100 to International Statistical Congress Fund.ⁿ Includes the Guy Bequest. The total invested is now valued at current prices.^o Including £126 for sale of books^p Includes purchase of £600 G.N.R. Stock.^q Includes special sales^t Includes £570 from sale of Consols and £68 Income Tax refunded^u Includes £436 for re-decoration of premises, installing electric light, and furniture.^v Includes £169 for furniture and carpets and "at home" expenses.^x Includes £100 to International Statistical Institute^z Includes £100 raised by sale of £184 14s 9d. Consols for the purpose of note x.^z Includes purchase of National War Bonds.^z Treatment as capital from 1911 onwards. *See Auditors' Report p. 557*

C.—*Estimated Numbers of Books Added to the Library and Lent, and Numbers of Borrowers from the Library in the Sessional Years 1925-26, 1926-27 and 1927-28.*

| Months. | Works Received.* | | | Books Lent. | | | | Borrowers. | | | Months. |
|-----------------|----------------------------|-------|----------|-------------|-------|----------|-------|----------------------------|-------|----------|-----------------|
| | 1925-26, 1926-27, 1927-28. | | 1927-28. | 1926-27. | | 1927-28. | | 1925-26, 1926-27, 1927-28. | | 1927-28. | |
| | Works. | Vols. | | Works. | Vols. | Works. | Vols. | Works. | Vols. | | |
| 1927. | | | | | | | | | | | 1927. |
| June ... | — | — | — | 101 | 108 | 146 | 174 | 60 | 83 | 59 | June |
| July ... | 687 | 640 | 645 | 85 | 96 | 101 | 107 | 44 | 60 | 64 | July |
| August ... | — | — | — | 54 | 72 | 80 | 84 | 27 | 47 | 33 | August |
| September ... | — | — | — | 87 | 104 | 122 | 144 | 51 | 66 | 48 | September |
| October ... | — | — | — | 151 | 177 | 142 | 155 | 62 | 75 | 79 | October |
| November ... | — | — | — | 167 | 185 | 147 | 166 | 85 | 69 | 94 | November |
| December ... | — | — | — | 115 | 128 | 151 | 174 | 54 | 74 | 55 | December |
| 1928. | | | | | | | | | | | 1928. |
| January ... | 365 | 324 | 298 | 140 | 181 | 193 | 243 | 76 | 96 | 71 | January |
| February ... | — | — | — | 172 | 202 | 117 | 134 | 75 | 73 | 62 | February. |
| March ... | 218 | 212 | 135 | 134 | 159 | 197 | 231 | 70 | 102 | 73 | March |
| April ... | — | — | — | 109 | 117 | 121 | 143 | 63 | 66 | 55 | April |
| May ... | 135 | 252 | 200 | 91 | 98 | 162 | 186 | 46 | 80 | 47 | May |
| 12 months | 1,405 | 1,428 | — | 1,406 | 1,627 | 1,679 | 194 | 713 | 891 | 740 | 12 months. |
| Monthly average | 117 | 119 | 106 | 117 | 135 | 140 | 162 | 59 | 74 | 62 | Monthly average |

* These figures represent the number of works entered during the year, under "Additions to the Library," in the *Journal*, and not the number of separate volumes; they are exclusive of about 200 weekly, monthly, and quarterly periodicals regularly received.

D.—(i.) *Comparison of Income, 1917–1927.*

| | 1917. | 1918. | 1919. | 1920. | 1921. | 1922. | 1923. | 1924. | 1925. | 1926. |
|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Dividends and interest (excluding those on special funds) ... | £ 276 | £ 274 | £ 276 | £ 291 | £ 279 | £ 345 | £ 387 | £ 389 | £ 399 | £ 395 |
| Income tax refunds ... | — | 107 | 108 | 108 | 109 | 109 | 33 | 11 | — | — |
| Annual subscriptions ... | 1,186 | 1,131 | 1,296 | 1,373 | 1,480 | 1,499 | 1,476 | 1,638 | 1,611 | 1,619 |
| Journal sales ... | 311 | 304 | 602 | 740 | 687 | 688 | 738 | 666 | 806 | 780 |
| „ advertisements ... | 9 | 3 | 3 | 3 | 17 | 23 | 17 | 13 | 14 | 9 |
| Catalogue and Index sales ... | — | — | — | — | — | 9 | 3 | 3 | 1 | 11 |
| Use of rooms, etc. (Royal Econ. Soc. and others) ... | 35 | 35 | 35 | 120 | 60 | 60 | 60 | 60 | 30 | 90 |
| Miscellaneous ... | — | — | — | — | 1 | 3 | 2 | 4 | — | — |
| Total ordinary income ... | 1,817 | 1,855 | 2,320 | 2,535 | 2,633 | 2,737 | 2,716 | 2,784 | 2,861 | 2,904 |

D.—(ii) *Comparison of Expenditure, 1917–27.*

| | 1917. | 1918. | 1919. | 1920. | 1921. | 1922. | 1923. | 1924. | 1925. | 1926. |
|--|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Rent, including hire of hall, and taxes ... | £ 494 | £ 398 | £ 400 | £ 398 | £ 421 | £ 429 | £ 429 | £ 429 | £ 416 | £ 409 |
| Fuel, light, water ... | 57 | 54 | 67 | 82 | 74 | 85 | 100 | 93 | 91 | 65 |
| Furniture, repairs, and office equipment ... | 21 | 21 | 16 | 17 | 17 | 17 | 17 | 17 | 14 | 31 |
| Salaries, wages, and Nat. Insee. ... | 27 | 16 | 42 | 43 | 56 | 18 | 738 | 33 | 59 | 65 |
| Housekeeping expenses ... | 475 | 491 | 606 | 603 | 705 | 736 | 738 | 751 | 750 | 757 |
| Journal costs, including repairs— | 29 | 36 | 34 | 40 | 40 | 43 | 42 | 65 | 54 | 65 |
| — chase (books and binding) ... | 435 | 591 | 609 | 841 | 881 | 904 | 853 | 850 | 872 | 1,066 |
| — Advertising ... | 30 | 33 | 135 | 22 | 17 | 103 | 127 | 135 | 136 | 25 |
| Stationery and sundry printing ... | 71 | 100 | 137 | 183 | 172 | 199 | 221 | 224 | 233 | 25 |
| Postage and telephone ... | 71 | 42 | 40 | 154 | 159 | 155 | 150 | 140 | 139 | 100 |
| Miscellaneous, including medals ... | 19 | 12 | 30 | 31 | 28 | 10 | 21 | 9 | 10 | 8 |
| Total ordinary expenditure ... | 1,742 | 1,917 | 2,252 | 2,626 | 2,735 | 2,739 | 2,741 | 2,767 | 2,771 | 2,927 |
| <i>Special expenditure.</i> | | | | | | | | | | |
| Catalogues (salary and printing) ... | — | 11 | 180 | 180 | 180 | 600 | 180 | 180 | 180 | 151 |
| Official Statistics Committee ... | — | — | 51 | 3 | — | — | — | — | — | — |
| Dinner to statisticians ... | — | — | — | 35 | — | — | — | — | 10 | — |
| Index statistics ... | — | — | — | — | — | — | — | — | — | — |
| Journal Index, 1909–24 ... | — | — | — | — | — | — | — | — | — | 32 |
| Total ... | 1,742 | 1,928 | 2,483 | 2,844 | 2,915 | 3,339 | 2,921 | 2,947 | 2,961 | 3,110 |

Report of the Council—Session 1927-28. [Part IV,

| 1927 |
|-------|
| £ |
| 376 |
| — |
| 1,665 |
| 791 |
| 11 |
| 6 |
| 61 |
| 7 |
| 2,917 |

1928.]

Report of the Council—Session 1927-28.

| 1927 |
|-------|
| £ |
| 413 |
| 91 |
| 14 |
| 19 |
| 785 |
| 91 |
| 63 |
| 1,096 |
| 119 |
| 21 |
| 158 |
| 159 |
| 9 |
| 3,038 |
| 25 |
| — |
| — |
| — |
| 3,063 |

D.—(iii) *Comparison of Total Income and Expenditure, 1917–27.*

| Year. | Income (including Compositions placed to Income) | Expenditure (including Special) | Deficit (—) or Surplus (+). |
|-------------|--|---------------------------------|-----------------------------|
| | £ | £ | £ |
| 1917 | 1,869 | 1,742 | + 127 |
| 1918 | 2,077 | 1,928 | + 149 |
| 1919 | 2,593 | 2,483 | + 110 |
| 1920 | 2,785 | 2,844 | — 59 |
| 1921 | 2,634* | 2,915 | — 281 |
| 1922 | 2,737* | 3,339† | — 602 |
| 1923 | 2,716* | 2,921 | — 205 |
| 1924 | 2,784* | 2,947 | — 163 |
| 1925 | 2,861* | 2,961 | — 100 |
| 1926 | 2,915 | 3,110 | — 195 |
| 1927 | 2,917 | 3,063 | — 146 |

* Compositions received in and since 1921 have been placed to capital account (in 1921, £231; in 1922, £126; in 1923, £233; in 1924, £105; in 1925, £189; in 1926, £115; in 1927, £84).

† Includes £395 spent on printing of Catalogue, £122 only coming out of income.

D.—(iv) *Comparison of Investments at December 31, 1913 and 1927.*

| Investments. | Nominal holding. | | Remarks. |
|---|------------------|-------------|---|
| | End of 1913. | End of 1927 | |
| | £ s. d. | £ s. d. | |
| Consols A. | 2,371 6 0 | 2,236 11 3 | |
| Consols B, Guy Bequest. | 10,527 12 3 | 10,527 12 3 | |
| G.N.R. Pref. Conv. Ord. Stock. | 1,000 0 0 | — | |
| L.N.E.R., 4 per cent. Second Pref. Stock. | — | 666 0 0 | |
| L.N.E.R., 5 per cent. Pref. Ord. Stock. | — | 266 0 0 | |
| Conversion Loan. | — | 966 0 0 | Conversion of £600 War Bonds representing savings during the war. |
| Total holding, General Fund (nominal values). | 13,898 18 3 | 13,762 3 6 | Total actual values are shown in Appendix B. |

NOTE.—(a) In addition to these holdings the Society has its Building Fund worth in 1914 £582, and in 1927 £918.

(b) At the end of 1914 the number of compounders was 169, and at the end of 1927 it was 199. At the latter date £4,053 of capital represents life compositions, as against £3,549 in 1914.

PROCEEDINGS OF THE NINETY-FOURTH ANNUAL GENERAL MEETING
OF THE ROYAL STATISTICAL SOCIETY, HELD IN THE HALL OF
THE ROYAL SOCIETY OF ARTS ON TUESDAY, JUNE 19, 1928.

The Chair was taken by the Ex-President, MR. UDNY YULE, C.B.E., F.R.S., at 6.30 p.m.

The HONORARY SECRETARY read the circular convening the meeting.

The Report of the Council for the financial year 1927 and the Session 1927-28 was presented to the meeting and taken as read.

The CHAIRMAN, in moving the adoption of the Report, pointed out that the number of the Fellowship was well maintained, and now amounted to 1,060. As usual, unfortunately, there had been losses by death. He would especially mention the regret felt at the death of Lord George Hamilton, whose Presidency would be well remembered with the greatest pleasure.

Among several interesting items referred to on the fifth page of the Report, he would particularly direct attention to the paragraph referring to the organization of additional meetings for study and discussion.

The Council had undertaken the publication of a monograph by Professor A. L. Bowley on the late Professor Edgeworth's mathematical-statistical writings. This was of great interest, and should lead to general interest and appreciation of Professor Edgeworth's work.

The Council also drew attention to the appointment of Sir Josiah Stamp as Director of the Bank of England.

The CHAIRMAN called upon the Honorary Secretary to present the list of defaulters.

The HONORARY SECRETARY accordingly read the following list of persons whose names had been removed from the roll of the Society under Byelaw 9, their annual subscriptions having been in arrear for three years or more :—

James Byrne, Charles Cox, David Ghambashidze, J. Forbes Marsden,
Sir Edward Penton, M. S. Ramaswami, E. Ratcliff, G. R.
Richardson, R. Sundarachari, J. A. Taylor, M. Vaidyanathan,
W. H. C. Wayte, D. G. White, L. W. Zimmerman.

The HONORARY SECRETARY moved that the Report of the Council be adopted, entered in the Minutes, and printed in the *Journal*.

MR. DUDLEY WALTON said he had great pleasure in seconding the motion. He was particularly pleased to learn from the Report that something was to be done to extend the work of the Society in the way of informal meetings. He had great expectations of the many benefits that would come to the younger Fellows of the Society from those meetings, and he felt sure that the new Council that had been elected would do all they could to guard the interests of the members of the Study Group.

The motion was put to the meeting and carried unanimously.

The ballot for the election of the Council and Officers then took place.

MR. NIXON said he had much pleasure in moving a Vote of Thanks to the Members of the Council and Officers of the Society for the services rendered by them during the last year. He was particularly sorry to notice that Mr. Flux had vacated the post of Honorary Secretary; his service had been a great stimulus and was valued by all the Fellows.

MR. BURNETT-HURST heartily endorsed the Vote, and had pleasure in seconding the motion, which was then put to the meeting and carried unanimously.

MR. A. W. FLUX said that it had been suggested that, as the President was not present to acknowledge the Vote of Thanks on behalf of the Council, the senior of the Honorary Secretaries should take his place, although the senior of the Society's past Presidents was in the Chair. Mr. Flux could only say that the Council had done what they conceived to be their best; they had great hopes from the new development, and they would be prepared—and their successors also were likely to be prepared—to entertain any suggestions that appeared to them to be practicable for the development of the work of the Society along lines that would be satisfactory to the Society and likely to promote the interests of statistics in general. That had been the object of the Council in the past year, and they were glad to find that their work had met with the approval of the Fellows.

MR. UDNY YULE announced that the Council and Officers proposed had all been duly elected, and he heartily welcomed Mr. Macrosty to his new office as Honorary Secretary.

The meeting then adjourned to November 20, 1928.

REVIEWS OF STATISTICAL AND ECONOMIC BOOKS.

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1.—*Probability and its Engineering Uses*. By Thornton C. Fry, Ph.D. xiv + 476 pp. London: Macmillan. 1928. Price 30s. net.

Readers of this *Journal* should not be misled by the word "Engineering" in the title of the book under review. About two-thirds of the book are devoted to general probability, and of the remainder not a great deal is purely technical in character; for example the treatment of the problems met with in the consideration of an efficient telephone service might be of interest to medical statisticians, if they could find analogies between the crowding of subscribers on telephone exchanges and the crowding of patients into hospitals or of bacteria in the body. With this part of the subject-matter, however, and that devoted to molecular physics it is not proposed to deal in this review. We will confine our attention to the major part of the book, which deals with the mathematical theory of probability, and here we may venture to accord praise for a very fine piece of work.

The treatment is very full, and this is really necessary in a book on probabilities, though not all authors realize it. The method here adopted by Mr. Fry of outlining the solution of a problem by first considering a simple concrete case and then proceeding to the more difficult general case is specially adapted to the reader the author has in mind—one who is not a pure specialist in probability theory, but who can use some theory in order to handle such problems as

are considered in the third part of the book. This treatment is at the same time adapted to the statistician who is not primarily a pure mathematician, but is desirous of handling statistics involving curve fitting and its ramifications with safety and ease. On these grounds the book may be recommended to such readers of the *Journal* as are interested in these problems.

The chapters of general interest are the first three devoted to Permutations and Combinations and Elementary Theory of Probability, the next two on Bernoulli's and Bayes' Theorems; the next four on Distribution Functions, the Binomial, Poisson, and empirical curves, Averages, Curve Fitting and Goodness of Fit. The subject of Correlation is not considered. The method of development of the argument suggests that the author has sought and found the right sort of phraseology, with a maximum of effect and a minimum of vagueness, to render simple to readers some fairly complicated ideas, and he explains in his introduction that the book is the outgrowth of notes prepared for lectures. It is inevitable, resulting from the author's presentation of the arguments as he himself develops them in his own mind, that he will find others disagreeing with him in some particulars. For instance, in the vexed question of Goodness of Fit, the author agrees with those who would diminish s^1

in the expression for $P = \text{Const} \int_x^\infty e^{-1x^1} x^{s^1-1} dx$, when considering whether the results of an experiment distributed in s^1 classes are reasonably likely to have originated from a population, the characteristics of which have been determined from information obtained from the sample in hand; the amount of this diminution being determined by the amount of information given by the sample used in the calculation of the characteristics of the supposed sampled population. The simple illustration of this kind which the author puts forward is that of the bias of a die. The results of an experiment of the throwing of a die 315,672 times give 5 or 6 appearing 106,602 times. The chance of obtaining such a result or a result less probable, on the assumption that the die's chance, at each throw, of showing 5 or 6 is one-third, is .000,000,2; the chance of the same event on the assumption that the fundamental chance is .337,699 $\left(\frac{106602}{315672}\right)$ is

unity. The author reasonably says that .000,000,2 is so small, that in default of *a priori* reasons to suppose the experiments unusual in character, it is preferable to consider that one-third is unlikely to be the fundamental chance, thus suggesting bias. But when he says that the chance being unity on the second assumption "merely reflects the fact that we have artificially forced an agreement between the estimate and the experiment by computing the one from the other" (p. 273), he is surely stating the facts in an uninteresting manner. We might say that, if we assume the fundamental chance to be .337 and find that the chance of the event is .4076 (see again p. 273), this result merely reflects the fact that we have artificially forced an agreement between the estimate and the experiment by taking .337 in the hope that the resulting chance would be greater

than one-tenth. Surely, the question how the figure 337,699 was obtained should have nothing to do with the question how likely it is that the experimental result was obtained with a die having that fundamental chance. It is left to the experimenter to weigh the probabilities in his mind with other factors known about the experiment, these other factors possibly being not susceptible to expression in arithmetical terms. After all it must be remembered that the be-all and end-all of probabilities is not the finding of numerical chances, the number merely serves to give an indication of something really unmeasurable.

This same idea of discounting the reasonableness of a theoretical population distribution, because its characteristics are obtained from the results of an experiment, which is developed later (p. 280 *et seq.*), is surely wrong. We want to test whether it is reasonable or not that a particular distribution will be found if we sample from a certain population, and the numerical value given to a certain chance is only the basis of the argument on this point. Surely we should not take into account the methods adopted to find the population distribution, especially when these methods are artificial, such as the methods of equating moments. The author would argue that, since we have found the population distribution by using the first four moments of the given distribution, we must take this into account in assessing the chance to be used as the basis of arguments on the reasonableness or otherwise of our experimental results having come from the supposed sampled population. But the method of moments is arbitrary, and the allowance on account of it is arbitrary. Suppose the experimental data were plotted in the form of a histogram, and an expert draughtsman were to draw a smooth curve which appeared reasonably to fit the data as shown in the diagram, and suppose the corresponding frequencies under the curve were estimated by means of any area-measuring instrument; we would then get a theoretical population distribution, which had been obtained from the given experimental distribution, just as that obtained by equating moments. We have forced the theoretical distribution in some way to reproduce characteristics of the given distribution (in fact it might be that accidentally we would get the same theoretical distribution as would have been obtained by the method of moments), but how much allowance is to be made in this case? The answer is unknown. Further, suppose that we obtain the theoretical distribution by using three moments of the given distribution and accidentally it happens that the fourth moments are also equal; should this be considered as reducing the index of χ under the integral sign above by one more, even though we have not *consciously* made *four* moments equal, but only *three*? The disadvantages of the graphic method are obvious, the advantages of the method of moments as a working instrument are many; but there are conceivably other methods of curve fitting less disadvantageous than the graphic method, which, however, would be equally difficult to fit in with this idea of discounting the use of the original data, in order to obtain some notion of the population from which it was drawn.

Surely the position should be, that when the theoretical curve is obtained, it should be judged on the reasonableness of its form (with which is involved the whole question of empirical frequency distributions) and on the reasonableness of the given data having been obtained from such a distribution, without any question entering as to how the exact constants of the mathematical equation to the distribution are calculated. E. C. R.

2.—*The Cost of Living in Foreign Countries.* xv + 402 pp. New York: The National Industrial Conference Board, Inc. 1927. Price \$3.50.

This excellent volume has three main sections. In the first thirty or so pages there is given an admirable survey of the principles upon which index-numbers of the cost of living are in practice compiled. The fundamental requirements of (1) determining a basic budget, (2) ascertaining prices at regular intervals, and (3) computing the index-number are set out with extreme clarity; alternative methods of fulfilling these requirements are described; and the popularity among the national statistical offices of this or that method is indicated. The second part of the volume, comprising some 350 pages, is devoted to succinct descriptive accounts of the index-numbers of all countries (except the United States) in which cost-of-living index-numbers are issued—beginning with Algeria and ending with Turkey. Particulars are given of over eighty index-numbers distributed throughout some forty countries. If the level of accuracy is as high throughout as it is in the account of the British index-number it is high indeed, and since the information upon which each description is based was in practically all cases obtained by direct correspondence with the statistical office or other authority compiling the index, there is warrant for believing this to be so. For the convenience of those whose interest is not in the results but in the machinery by which they are obtained, the characteristics of all these index-numbers are further set out in tabular form under such heads as "Localities covered," "Date when begun," "How often published," "Major items covered," "Basis of budget," "Type of families covered," "Base period," "Mathematical formula," etc., etc.

The third and last part of the volume consists of commentary upon the similarities and differences revealed by the foregoing descriptions as between the various countries.

The volume is the fifth of a series described as "Studies of the Cost of Living." It will be found a handy compendium of information for all who are interested in the structure and working of index-numbers, and will prove of very great convenience to all who wish to make intelligent use of foreign cost-of-living index-numbers, and particularly to those who are seeking to draw inferences from the relative movements of one index-number and another. Such pursuits are generally futile or worse unless differences in the composition of the index-numbers are known and allowed for. The National Industrial Conference Board has hereby enabled that to be done with a minimum of trouble. J. H.

3.—*Wages and Hours of Work in the Coal-Mining Industry.* xix + 279 pp. International Labour Office, Geneva, 1928. Price 6s.

This volume is the outcome of an appeal made in 1925 to the International Labour Office by the Committee of the International Miners' Federation for an enquiry into the hours of work, holidays, and wages paid by employers, for different categories of mine-workers in the principal coal-producing countries. For comparative purposes only statistics of European countries have been taken, but in an Appendix of 50 pages is summarized the information available for non-European countries where, it is estimated, about 55 per cent. of the total output of coal is produced. The United States alone produces almost as much coal as the whole of Europe.

Great difficulty was experienced in dealing with the statistics obtained from the various countries owing to the want of uniformity in the material supplied, and the volume sets out in great detail most of the difficulties met with in co-ordinating the statistics. The International Office claims, however, to have attained the maximum of co-ordination and comparability possible. The results of the comparison were communicated to the Governments and organizations concerned, and it was only after consultations with these bodies, the results of which "were taken into account in so far as was judged consistent with the truth," that it was decided to publish the results of the enquiry.

The information in the report is confined for the most part to that relating to 1925, but later figures, where known, are given in an Appendix.

For the purposes of international comparisons statistics are confined to those of wages and hours, although to arrive at the results it was necessary to consider quite as carefully the statistics of numbers employed and of mineral raised. It is not made clear how uniform definitions of "saleable coal" and "commercially disposable coal" were arrived at. Nothing is said, for instance, as to whether small coal or dust used for patent fuel is included or excluded.

As regards hours of labour, it appears that in 1925 the statutory hours for underground workers in coal mines in the European countries under consideration were eight per day, except in Great Britain, where it was seven hours. The hours of surface-workers were not fixed by legislation in Great Britain and Holland, but in the other countries there is a statutory day of eight hours, except in Germany, where overtime is worked. In Great Britain surface-workers' hours were about 46½ per week. Reduced to a common unit the daily hours appear to have varied from about 7½ in Czechoslovakia, the Saar, and Great Britain, to 8½ in Aachen and German Upper Silesia. After making deductions for time travelling underground, breaks, etc., which are elaborately explained, the length of time spent by hewers at the face was found to vary from 5 hrs. 38 mins. in Czechoslovakia, and 5 hrs. 45 mins. in Great Britain, to 6 hrs. 30 mins. in Belgium. Since 1925 the hours of labour of coal-miners in Great Britain have been increased.

For comparative purposes the statistics of wages shown have

been taken to be "the whole amount of wages and other advantages received by the workers by reason of their employment in and about the mines." It comprises money wages (excluding deductions for occupational charges and penalties, workers' contributions towards expenses of social insurance), allowances in cash and kind and payment (if any) for holidays. Results are stated in national currencies and in gold francs, and finally index-numbers are given which make allowance for the variation in the prices and quantities of food consumed by mine workers in the various countries. It goes without saying that statisticians will differ as to the propriety of the methods assumed by the International Labour Office in arriving at their final comparison of real wages, but the arguments for the plan adopted are put fully and with great skill, and the material in the volume will enable different estimates to be calculated. There seems to be a superfluous "not" in line 8 of page 183, where the "basket of provisions" plan is explained, which renders the method difficult to understand.

Money wages * were highest in Great Britain (100) and lowest in Poland (39). For France and Belgium the index-numbers were 48, for Czechoslovakia 49. For Germany they varied from 50 in Upper Silesia to 63 in the Ruhr. For Holland the index-number was 74. Weighted with the prices of food, the numbers were—Great Britain 100, Holland 83, Belgium 73. For all the other countries the numbers were 67 or under, and for Poland it was 50.

Some valuable tables are added giving the relative levels of wages-cost per ton.

A curious statement is made in the preface in course of a discussion on the depressed conditions of the coal industry, which must be due to some misconception of the practice of the industry. "Is it wise," it says, "in present conditions, when 50 or 100 million tons of coal are taken from the soil each year without being able to find a purchaser, to increase still more this unsaleable stock by an intensified production?" There is really no over-production of this kind, and never has been. Coal-owners do not to any extent raise coal in excess of more or less immediate requirements. The cost of extra handling and the rapid deterioration of coal are too great for such stocking of the mineral ever to have taken place. What happens is that the amount of the overhead charges and of capital invested are too burdensome when the quantity of coal that can be disposed of is so much below the possible output of the mines.

W. A. B.

4.—*The British Coal Dilemma*. By Isador Lubin and Helen Everett. With the aid of the Council and Staff of the Institute of Economics. 364 pp. London: Allen and Unwin, 1927. Price 12s. 6d. net.

Known facts are here presented to us in perspective and from a fresh angle. The nature and causes of the coal problem are analysed from a distance, where the observer's view of the wood is not

* Average daily earnings—all workers.

hindered by the trees nor distorted by traditional or political prejudice. These American authors have reviewed the whole course of the British coal industry, and the narrative, which is firmly based on official documents and other authoritative publications, makes interesting and most salutary reading. The successive steps which led to the present impasse are clearly recognizable. An introductory chapter discusses the difficulties of the actual situation, which the authors envisage as mainly due to the seeming inability of the parties at issue to abandon their respective fundamental assumptions, and to the fact that the remedies hitherto tried or proposed have been directed to immediate alleviation, and a "long-distance programme" has never been thought out. The coal industry has, indeed, always lived from hand to mouth, and has proved unable to adapt itself to the changes, geological, social, and economic, which, as it is now possible to see, had been gradually developing during the past thirty-five years, and would almost inevitably have led in the end to disaster, though the crisis was precipitated and intensified by the war. The seeds of decay were indeed bred by the very nature of the prosperity. The first part of the book traces the "Sequence of Events" from the early stages of coal-mining through the period of prosperity which reached its climax in 1914, and the vicissitudes of the war and post-war years, ending with an account of the Great Strike; Part II is concerned with the "Logic of Events," and in Part III, "Facing the Issues," the authors discuss the future of the coal market and the various proposals of owners, miners, and technicians for the rehabilitation of the industry. It is to the last named that they look for salvation. C. T.

5.—*British Food Control*. By Sir William H. Beveridge, K.C.B. xx + 435 pp. London: Milford, Oxford University Press: New Haven: Yale University Press. 1928. Price 17s. 6d.

Sir William Beveridge's work represents the latest addition to the *Carnegie Endowment Social and Economic History of the World War*. Although, as Sir William himself puts it, the story of British Food Control cannot from the very nature of its material be told in Ercles' vein, the subject is one which makes a wide appeal to food producers and traders no less than to administrators, economists, and statisticians. In the minds of all in these classes who were at any time brought into contact with Sir William during his stay at the Ministry of Food, the announcement of the work under review created a sense of lively anticipation which is now amply justified by the merit of the work itself. In style it falls midway between its predecessors in this series, on the one hand (*Food Production in War*, by Sir Thomas Middleton, and *Experiments in State Control at the War Office and the Ministry of Food*, by E. M. H. Lloyd), and, on the other hand, the discursive account of the same subject given by Sir William's successor in office at the Ministry of Food, Mr. F. H. Collier in *A State Trading Adventure*. Sir William had a very unattractive mass of material to handle, but he has succeeded in making the book a consecutive and animated narrative which holds

the reader's attention throughout. At the same time he has been sparing in his personal references by way of eulogy or criticism, using them only to illustrate some general conclusion as to economic science or the art of administration: they are none the less shrewd and accurate.

The tribute to Lord Rhondda which he repeats in this volume from another source is one which every worker at the Ministry of Food, in however humble a capacity, would endorse. One of the great principles of Lord Rhondda's career was that, on the whole, and even at the risk of mistakes, bigger results can be achieved and harder work got out of a staff by trusting and supporting them than by supervision and pressure, by appreciation rather than by criticism, by hope rather than by fear.

The work of the Ministry of Food impinged upon the economic life of the community at so many points in removing from the operation of so-called economic laws so many functions of production, distribution, and exchange, that a reasoned account of its activities by an economist of the standing of Sir William Beveridge could not fail to be of absorbing interest to the student of economics. We may suggest that it will be of no less interest and value to the teacher of economics as a storehouse of examples of the arts of applied economics and public administration. It is difficult to make a selection of these dicta, the justification of which may be found in the text; we confine ourselves to one example from each of these two branches. On the economic side, "The circumstances in which Government control of any food can confer substantial benefits upon the consumer are that the supply of that food shall be insufficient or uncertain; the conditions of control being effective for its purpose are that it shall be complete in itself and international in extent." And on the side of public administration, "The success of the Ministry of Food was founded on the satisfactory solution of two administrative problems—on the combination of central initiative with decentralized execution, and on the judicious blending of lay and expert elements in its staff. Its work as a trading concern was made possible only by the suspension of the financial and parliamentary controls normally applied to Government Departments." To this we add one more example which sums up the whole history of the Ministry of Food during the critical period of its existence. "To complete control, that is to say complete reversal of Mr. Runciman's first policy, Lord Rhondda came, and came not so much because of any difference between his own and Mr. Runciman's general views, but because of their similarity. Mr. Runciman and Lord Rhondda were both economists, that is to say, they sought the remoter as well as the immediate consequences of their own and other people's actions; they were both of the tiresome sect which keeps on asking what happens to exports if one shuts out imports. Each worked on a principle and each on the whole succeeded, though their principles were opposite. Mr. Runciman's principle of no interference at all with private enterprise suited the conditions of the first two years of war; plenty was possible and plenty was secured. Lord Rhondda's principle of

complete interference was even more definitely the only one that suited the last two years of war; sufficiency, fair distribution and fair prices were attainable only by supersession of private enterprise, and by that supersession they were achieved. Between Mr. Runciman and Lord Rhondda fell the period of food control without principle on practical lines; a scurrying hither and thither in chase of the unapprehended consequences of ill-considered actions."

With only one of Sir William's deductions from the experiences of control do we venture to differ, and even then only on a matter of degree. The Ministry of Food, bold as it was, could not face the task of introducing during war-time new channels of distribution of food-stuffs in this country. In calling to its aid all classes of food traders it took the only course open to it, but it created a serious problem for post-war years. One has only to consider the extensive list of food trade organizations to-day to realize how many of them date their effective existence from the years of control. Sir William does indeed admit the possibility of danger to consumers from the combinations of traders which were stimulated by war-time control, but he adds that the powers of combinations to raise prices are in nearly every case closely limited by the possibilities of substitution, and with food the range of substitution is wide. We venture to suggest that here the abstract economist has succeeded in hoodwinking the practical administrator, and a dispassionate survey of the present position of food distributors in the social and economic scale in comparison with their pre-war position would reveal that these organizations have played an effective part in the hurly-burly of changing price levels since the war.

The volume is well illustrated throughout by statistical tables and diagrams, and it contains a large statistical appendix which not only gives for the first time in a collected form numerous interesting tables prepared by the Ministry of Food, but also a still more extended list of titles of tables which may be consulted at the library of the Board of Trade. Sir William has not attempted any critical treatment of the statistical material, and the absence of this in the finished work may be attributed to the death of Sir Edward Glinner, which deprived him of the latter's general collaboration in the early stages of the preparation of the material for this volume.

Sir William's record of the work of the Ministry of Food amply confirms the opinion generally suggested by any consideration of the problem as an abstract one, that the control of home-produced supplies provided the Ministry with some of their greatest difficulties. The elusive rabbit upon which *Punch* commented at the time so aptly is typical of the more serious problems presented by potatoes and milk. Sir William devotes considerable space to these and similar problems, and one may be pardoned for characterizing his treatment of them as not altogether friendly to the home producer. It may well be that at any stage maximum producers' prices were justified by the response made to them by producers, and that the last stages of control were prolonged with the object of maintaining producers' prices rather than hastening the decline of consumers' prices, but

one cannot overlook the sense of injury created by the general knowledge that for a considerable time the profits made on home-grown cereals and meat were used to subsidize the corresponding imported supplies. It is rather curious that the only two errors of statement we have discovered in the volume relate also to home supplies. Surely at no time have wheat offals been used as a food stuff for "animals (chiefly horses)" (p. 30), and the scale of prices for cattle for the 1917 Army Purchase Scheme, which was deliberately aimed at a supply of half-meated cattle, is made to apply to cattle yielding more than 73 per cent. of their weight as dead meat (p. 142)! There is also a misprint on p. 87 which assigns to the conference of allied representatives which prepared the Wheat Executive Agreement the date of November, 1926. These, however, are very minor errors which serve only to emphasize the herculean nature of the task which Sir William single-handed has so ably discharged.

J. B. G.

6.—*The Reserve Banks and the Money Market.* By W. Randolph Burgess, Assistant Federal Reserve Agent, Federal Reserve Bank of New York. xxi + 328 pp. New York and London: Harper & Brothers. 1928. Price 12s. 6d. net.

It may be submitted with some confidence that the first thing necessary in any statistical investigation is that the data should be abundant, sufficient, and precise, and, secondly, that there should be an understanding of the primary economic facts underlying these data. When so much has been secured it will be possible to determine by what method of examination, mathematical or other, further elucidation can be obtained through the analysis or comparison of different groups of the data. The monthly *Federal Reserve Bulletin*, published by the Federal Reserve Board, contains an abundance of statistics relating to American banking, and Dr. Carl Snyder and others have expounded them as evidence of the economic condition of the country. Students who desire to investigate them independently of such authorities will find in Dr. Burgess's book just that economic background which is required to explain how the statistics come into being.

A good deal of the book covers familiar ground, such as the explanation that under the Federal Reserve System banking reserves are pooled so that their amount is reduced, while elasticity is preserved through the power of the member banks to borrow from the Reserve Banks. A new form of currency was supplied, the Federal Reserve note, which fluctuated according to the national need for money. Means of payment have been simplified by systematic handling of out-of-town cheques and the abolition of the "exchange charge" of cheques from a distance. A trustworthy banking agency has been provided for the use of the Government, and the United States Treasury is now more independent of the money market than ever before.

The New York money market is the national market for surplus funds. Member banks can deal with three markets—those for

commercial paper, Government securities, and the Stock Exchange—but the Reserve Banks with two only those for Government securities and for bills. The bill market is a creation of the past twelve years, so far as the United States is concerned; through the banker's bill the seller of goods can obtain immediate payment for his goods, and the market for such bills is supported by the Reserve Banks, which are always ready to buy them, thus putting additional funds into the market in times of strain.

The problem of the Reserve Banks, as Dr. Burgess says, is "to aid in the adjustment of the volume of credit to the volume of business. Maladjustments in this relationship tend towards inflation, rising prices and speculation on the one hand, or deflation, falling prices and depression on the other." Previously "no one was responsible for general credit conditions"; now the directorates of the twelve Reserve Banks, co-ordinated by the Federal Reserve Board, share that responsibility, and it is noteworthy that the majority of those directors are not bankers. Extension of credit usually takes place semi-automatically by the member banks coming to the Reserve Banks either to obtain loans or to get bills rediscounted, and it is important to note that the Reserve Banks can only deal with such applications quantitatively; "the judgment of the officers of our many thousands of banks is still the principal safeguard against the improper use of credit." Fortunately there is a tradition against borrowing, and the bank which is continuously in debt to its Reserve Bank loses credit. A second restraint is that of the discount rate, which is a middle rate between the open market rate for commercial paper and the rate for bankers' acceptances. Experience shows that banks will borrow at such a rate to meet seasonal movements, but not for speculative loans.

"Open-market operations" have attracted much attention of recent years, as one of the chief weapons by which a Central Bank can influence credit. In the United States the phrase is used in two senses; broadly to signify "all those transactions in which the Reserve Banks employ their funds besides their loans to member banks," but more specifically "those transactions in which the Reserve Banks ordinarily exercise the initiative, that is, the purchase and sale of government securities." For the proper understanding of American banking statistics it is important to know the precise way in which open-market operations, in the restricted sense, affect the member banks. It is wrong to suppose that the purchase of securities by Reserve Banks would immediately increase the total volume of credit. "As a matter of practice," says Dr. Burgess, "this seldom takes place. It was noted that whenever the member banks are in debt at the Reserve Banks they try to pay off that indebtedness. Under these conditions, when a member bank receives a Federal Reserve check put into the market through the purchase of government obligations, that bank will use the check to liquidate any borrowings from the Federal Reserve Bank rather than use it for a further extension of credit. In case the member bank receiving the check is not in debt at the Reserve Bank, and

therefore employs the funds by purchasing additional investments or making additional loans, the extra amount of credit thus put into the market usually finds its way promptly to some bank which is in debt at the Reserve Bank. Thus the usual effect of a purchase of Government securities by the Reserve Banks is a corresponding reduction in the borrowing of member banks. . . . Conversely, when a Reserve Bank sells Government securities it receives in payment a check drawn on some member bank. This check is chargeable against the reserve deposit of the member bank at the Reserve Bank, and the member bank, unless there is offsetting credit, finds itself deficient in its reserves. In order to correct this deficiency the member bank either borrows from the Reserve Bank or sells its bills, or else throws the burden on some other bank by selling investments or calling in loans to brokers in the open market. The net result is usually an increase in member-bank borrowings or in some other form of Reserve Bank credit" (pp. 210-1). An interesting diagram covering the years 1922-6 shows "this general tendency for the purchases or sales of government securities to be almost directly offset by changes in other forms of Reserve Bank credit."

"The result of open-market operations may be summarized by saying that purchases of securities by Reserve Banks tend to relieve member banks from indebtedness to the Reserve Banks, and thus lead them to adopt a somewhat more liberal lending policy. Money rates become easier. Such purchases tend to create a borrower's market. Conversely, sales of securities by Reserve Banks increase member-bank borrowing and lead the banks to adopt a somewhat less liberal lending policy. Money rates grow firmer. Sales of securities tend to create a lender's market" (pp. 214-15). These operations can also prepare the way for a change in the discount rate and support it when made. Since 1923 open-market policy has been carried out by a committee acting for all the Reserve Banks.

Space does not permit our dealing with Dr. Burgess's account of the manner in which the Federal Reserve Board has dealt with the great influx of gold into the United States and the way in which serious inflation of prices has been prevented. Direct discouragement of member-bank borrowing, the unwillingness of member banks to be heavily indebted to the Reserve Banks, the substitution of gold certificates for Federal Reserve notes, the application of the open-market and discount policy, the assistance given to foreign governments in the restoration of the gold standard—in all these ways the Federal Reserve gold policy found expression.

Mr. Strong, governor of the Federal Reserve Bank of New York, in his preface to this book sets forth as a desideratum, "some description of the System's functions and methods which will show its place in the economic life of the country, which will be comprehensive and at the same time sufficiently simple and illuminating as to be truly instructive to the average reader," and claims that Dr. Burgess has met these requirements. That claim may be fully, and even enthusiastically, conceded.

H. W. M.

7. — *Economics of Instalment Selling: a Study in Consumers' Credit, with special reference to the Automobile.* By Edwin R. A. Seligman, LL.D., McVickar Professor of Political Economy in Columbia University. 2 vols. New York and London: Harper Bros. 1928. Price \$4 each volume.

"There is no topic in modern economic life," says Professor Seligman, "which has given rise to a wider variety of opinions than that of instalment sales. . . . They have gone through the whole gamut from enthusiastic approval to unmeasured condemnation. To some, instalment selling has brought about a revolution as profound and as salutary as the Industrial Revolution; and to it is ascribed the phenomenal prosperity which the United States has of recent years enjoyed. To others, instalment selling is a danger of the first magnitude, calculated to undermine not only business prosperity, but the morale of the American people."

Although a competent study of the problem in its social and financial aspects is long overdue, no comprehensive investigation has hitherto been made, and discussion has remained on a journalistic plane, highly coloured by the fears and expectations of those immediately interested in the success of the movement or otherwise, and with little or no appreciation of the subtler economic problems involved. Professor Seligman is the first professional economist to undertake a serious and impartial survey of the facts of the problem and to throw its economic implications into a proper light, and he has succeeded once and for all in raising the whole discussion to a higher level. The present treatise, if bulky, is readable and well planned, and is written with a clarity of thought and lucidity of expression that is commendable because it is so rare in works of this description.

Professor Seligman is an enthusiastic supporter of the instalment system, not perhaps as it is, but as it might be. He is convinced that an entirely new chapter is here opening up in both theory and business life. "After more than a century devoted to the elaboration of the principles and the technique of banking and commercial credit, designed to fit the Industrial Revolution, we now stand on the brink of another revolution in economic science and economic life, scarcely inferior to its predecessor."

The present work treats the subject both analytically and historically and statistically, and its foundations have been supplied by a series of elaborate and intensive studies carried on with the help of a whole corps of investigators. These studies have been incorporated in five appendices which form the second volume.

Instalment selling in the sense of making a final liquidation through the method of successive fractional payments lays claim to undeniable antiquity. Traces of instalment transactions are to be found in the records of ancient Egypt, of Rome and other great cities of classical antiquity, and of the cities of the Middle Ages. Modern instalment selling is new only in the sense that it has been applied on a large scale in recent years to certain more durable consumption goods, especially to automobiles.

Exhaustive inquiries have been made by the author into the extent of instalment selling and the volume of outstanding instalment paper, with the conclusion that many of the existing estimates are grossly exaggerated. Instalment sales, in the case of the durable consumption goods to which the system is primarily applied, amounted at the end of 1926 to about 4,500 million dollars out of total retail sales of about 38,000 millions, and the total of outstanding instalment paper was about 2,000 millions.

In order to test the accuracy of the contention that prevalent views on the subject are biased by self-interest, sixty-seven opinions have been digested, with the result that the opinion of each individual quoted "can almost without exception be accurately predicted by taking into account the fact as to whether his own business interests are favourably or adversely affected, or, at all events, whether he thinks that they will be so affected by instalment selling." "Scarcely a single one of the judgments rested upon either a satisfactory factual basis or an adequate economic analysis." This method of appraising individual opinions is novel and should prove fruitful in other fields of enquiry.

The application of instalment selling to automobiles and similar commodities is generally discussed on the basis of the distinction between *production credit* and *consumption credit*.

Professor Seligman maintains that this contrast disappears when subjected to the light of modern economic analysis and develops his line of thought in a way that is ingenious and interesting. Capital value is nothing but the summation of the present value of future incomes, and it is emphasized that the recognition of income as the fundamental economic concept, implying a flow of satisfactions, has destroyed the validity of the old distinction between capital, as representing certain kinds of wealth, and non-capital, as representing other goods or commodities.

Pursuing this line of reasoning we find a similar blurring of the commonly accepted contrast between production and consumption.

"Both production and consumption are parts of a larger whole, namely, utilisation." Putting the contrast in the more usual way, production is thought of in terms of money income or tangible commodities; we think of consumption in terms of psychic income, or the satisfaction of wants. In the broader sense, however, there is really little difference between these two processes, for each deals with the relation of man to the outer world, and each involves a surplus of utilities over costs. "The true surplus is to be envisaged from the point of view of creative capacity or fine living." The inference drawn is that there is no longer any foundation for the opposition so often voiced against consumption credit, based on the idea that it represents something destructive, as over against production credit, which represents something creative. Consumption credit is in itself quite as legitimate as production credit, the legitimacy depending not upon the distinction between production and consumption, but on the kind of utilisation.

This seems to carry the matter too far. Admitted that, on the

highest plane of analysis, production and consumption become indistinguishable because the sole justification of economic activities is the appearance of a surplus over costs, it does not follow that the form in which that surplus materialises is practically indifferent. Credit floats on a stream of economic activity, and in that background the distinction between transferable and non-transferable satisfactions must remain fundamental.

Some general tendencies of instalment credit are next treated under the headings of its specific characteristics, luxuries and necessities, and the special problem of the automobile. According to Professor Seligman, instalment selling denotes a substantial addition to the total amount of credit rather than a change in the proportions in the various forms assumed by consumption credit. Much of the apprehension regarding instalment sales, he continues, rests upon the conviction that it is unsound to use or to consume first and to pay afterwards. But the typical purchaser who secures his automobile on the instalment plan pays at the beginning of each time interval for the uses of the automobile which he expects to enjoy during the particular period. He acquires a stock of unused transportation, and the essential criterion of the transaction is to be found in this characteristic of payment before utilisation. For all practical purposes this is far more significant than the ordinary distinction between producers' and consumers' goods.

In the final part of the study some problems connected with the special effects of instalment selling are examined. The consumer gets "worth-while" commodities which it would otherwise be impossible for him to acquire, but his judgments may be irrational. Instalment credit tends to strengthen the motives which induce a person to save and also increases his capacity to do so. This device, instead of simply advancing the time when demand becomes effective, really leads to an increase of purchasing power, and while it undoubtedly increases the cost of the product, this disadvantage is probably on the whole outweighed by corresponding advantages. Instalment selling tends in part at least to a stabilization and regularity of output, but above all, because of the device of fractional payments, to an actual increase and acceleration of production. The dangerous effects of the system on the credit structure have been exaggerated, and instalment credit is probably not open to the charges so often preferred against it in this respect.

Summing up the position, Professor Seligman says that instalment selling, like every new institution, is subject to the perils of novelty. It has engendered new devices and has created a new technique, but it has undoubtedly come to stay. The innocuous and the salutary must not be confounded with the inappropriate and the regrettable aspects, and in its ultimate and refined forms instalment credit will be recognized as constituting a significant and valuable contribution to modern economy.

Here the conclusions seem to be rather more definite than the evidence warrants. The modern development of instalment selling has occurred on a rising wave of prosperity, and a final verdict

cannot be given until the system has been tested over two economic cycles. In the meantime we are indebted to the distinguished author of this treatise for the skill and thoroughness with which he has investigated this controversial problem, and for the courage with which he has expressed his convictions.

L. R. C.

8.—*La Statistique et sa Méthode*. Par Lucien March. Revue d'Hygiène. Tome L. No. 2. Février, 1928. 137 pp. Paris: Masson et Cie.

Différences et Corrélation en Statistique. Par Lucien March. Journal de la Société de Statistique de Paris (1928). 29 pp. Paris: Berger-Levrault.

The former of these publications by M. March consists of three addresses, the first on the preliminary matters which have to be attended to before the data are collected—what is the problem? can the ideas involved in the statement of the problem be dealt with numerically? how will the measurements be made? who will collect the data? how should the data be handled? what amount of error is there involved in the collection of the data? what ratios will best represent simply the mass of figures? All these matters are under consideration in the first part of the pamphlet. The second part deals with the methods of analysing groups of individuals, the different averages which may be used, and different methods of measuring variability in the group. The third part treats of co-variation of the individuals of one group with those of another, and considers different methods of measuring this numerically. The pamphlet is very useful, the method of presentation is simple, and it is always a pleasure to read something on statistics which is not a mass of algebraic symbols, especially when the matter relates to the interpretation of the figures which the statistician handles.

The second offprint is more technical. It goes in more detail into the problem of the adequate representation of a statistical group by means of averages and measures of variability. The author suggests as a complement to the median and quartiles, which often in his view do not present as good an idea of the group as he would wish, the *medial* and *quartals*. These last involve the notion of the data being ordered in size as in the case of the median and quartiles, the medial being that measurement in the series when ordered, such that the total of those above is equal to the total of those below. For instance, if the n individuals of the group have these measurements, in increasing order of size, a_1, a_2, \dots, a_n , then a_s is the medial where $a_1 + a_2 + \dots + a_{s-1}$ is equal to $a_{s+1} + a_{s+2} + \dots + a_n$, or, if not equal, where the difference between these (without regard to sign) is least. The quartals are obtained similarly, lying between the medial and the highest and lowest measurements. He illustrates with data consisting of a group of individuals distributed according to their wages. He also recommends Gini's Mean Difference as a measure of variability in the group. The

paper also deals with correlation in more detail than in the first offprint, considering different methods of measuring the relationship between two variables. E. C. R.

9. - *Behaviour of Prices*. By F. C. Mills. 508 pp. New York: National Bureau of Economic Research. 1927. Price \$7.

Professor Mills's book is in a sense the parallel on the practical side of Professor Irving Fisher's book, *The Theory of Index-Numbers*, which deals purely with the theoretical aspects of the measurement and analysis of price changes. Not that Professor Mills does not delve deeply into theoretical questions, because he does; on one point at least he and his present reviewer crossed swords nearly three years ago, and in one chapter of his present book Professor Mills continues the duel. But more of this presently.

The procedure of the ordinary compiler of an index-number of prices is to take the prices of various commodities and, using whichever method he thinks most suitable, to reduce them to an index-number. Until recent years that in itself was thought sufficient for the economic observer.

Lately that work has been supplemented by additional analysis. With the extreme price movements brought about by the war it came to be felt that a single index-number, when supplemented by several subsidiary group indices for foodstuffs and textiles and numerals, did not reveal the full story. The grouping of the constituent price relatives around their average needed, it was felt, detailed analysis. This introduced the application of dispersion to price index-numbers. Professor Silverstolpe of Stockholm, and Professor Bowley, in one of his investigations, used the mean deviation. The reviewer has always used the arithmetic standard deviation, a course of action which he attempted to justify before the Society over four years ago. Finally, Professor Irving Fisher and now Professor Mills have adopted the logarithmic standard deviation and derivations therefrom, such as the index of dispersion cited by Professor Mills in the footnote to p. 257 of his book.

The present reviewer has already maintained that there was little practical advantage in using the logarithmic standard deviation, because it led by a longer and more obscure route to *approximately* the same goal as the simpler arithmetic standard deviation. He cited figures in support of that claim, to which Professor Mills has now rejoined that according to his tests, the approximation was best described by saying it led in one case to an error of 86 per cent., and in another to one of 26 per cent. Both these tests were admittedly applied to war years, and we could probably both agree that in more normal times the degree of error would be less. The real question is, first of all, how much less; and, secondly, whether accuracy in technique is not being gained at the expense of clarity of method.

If these results were designed for use by trained statisticians, well, the reviewer would surrender his case. But they are not: they are designed for the use of the general public, or at least for

the economist who is not necessarily accustomed to statistical devices. What he wants is something he can visualize, and from his standpoint the real question is not whether the arithmetic standard deviation is sufficiently accurate, but whether he can understand what it means. If not, we had better fall back on the mean deviation or even on simple quartiles, for unless we can make the public understand what we are trying to reveal, we have failed in our job. If Professor Mills will concede this point, and unless he can produce inexpert evidence to say that the man in the street understands his logarithmic index of dispersion, the reviewer is prepared to submit his case to the jury.

One more point may be taken up, namely, Professor Mills's conception of an index of displacement. To speak frankly, it seems wholly unnecessary. Its object is to measure the re-grouping of price relatives between, say, the year n and the year $n + 1$; when measuring from the base-year the dispersion for both these two years may well be the same. But the existence and extent of this re-grouping can easily be revealed by calculating the dispersion between the two years. If dispersion be calculated firstly from the base-year, and secondly and independently from the preceding year, there is no need to introduce the new conception of displacement, at the risk of further confusing the layman.

Space will not permit of consideration of the remaining and very valuable chapters of this book, but tribute must be paid to the quantity of suggestive and stimulating statistical work that the book contains. It is an example of high-grade work of a quality of which we all in both countries may feel proud. N. E. C.

10.—*Politique et Théories Monétaires Anglaises d'Après-Guerre*. Par Jean-Pierre Lazard. 125 pp. Paris: Société Anonyme du Recueil Sirey. 1927.

Professor Charles Rist contributes a preface to this book, which, we regret to find, is at the same time an obituary notice of its brilliant young author, who did not live long enough to see his work in proof. The study was undertaken after a year at Cambridge, and was submitted, with no thought of publication, to Professor Rist for criticism. He, however, regarded it as decidedly the most successful attempt made by a French writer to clarify and analyse British post-war monetary policy and theories, and himself published the first part in the *Revue d'Économie Politique*, while the second appeared in the *Revue Politique et Parlementaire*. Students of finance in France and in this country may alike be grateful for the opportunity of becoming acquainted with this lucid and penetrating little piece of analysis, which, unlike most of the numerous volumes dealing with similar subjects, is written with a verve and a crisp directness of expression which make its perusal a pleasure. As his editor justly observes, M. Lazard deliberately set himself a difficult and disciplinary task: that of unravelling the complexities of our post-war monetary history and determining the nature of its connection with current theory. In the first part of his book he traced the course of British financial policy from the end of 1919 onwards,

endeavouring to interpret the successive phases and to assign a justly proportionate weight to each of the determining factors. His analysis throws into high relief the restoration of financial prestige as the underlying motive which consciously or subconsciously directed the entire policy, and he discusses the effect on the country as a whole of what he regards as the victory of the City's interests over those of manufacturing industry, passing from present economic repercussions to an eventual possibility of England's transformation into a nation of bankers, brokers, carriers and other middlemen, and thus, like Venice and Holland in the past, of her finding that in maintaining opulence she has let slip her industrial power, and with it her national virility and her political ascendancy.

The monetary theories of various prominent economists are examined in relation to each phase of the deflationary period, but the second part of the book is especially devoted to their analysis in relation to the quantity theory, to exchange, and to the gold standard. M. Lazard has discussed in some detail the theories of Prof. Irving Fisher, of the Cambridge School, particularly as represented by Mr. Keynes, and of Mr. Hawtrey, for whose writings and views he reveals throughout a profound admiration and respect. It is sought to show when the several theories are essentially, though perhaps not obviously, in accord and to analyse their differences from one another and from continental theory. As the author remarks, although the present divergences among experts will doubtless tend to disappear as scientific truth is revealed by research and experience, yet, even when monetary theory has become so perfect as to leave no doubt about the result of a given financial policy, there will still be room for differences of opinion as to the relative importance of the interests involved—"a choice of sacrifice"; and thus the ultimate problem of monetary and indeed of all economic policy is in reality a social or a moral one.

We leave the book with a feeling of real regret at the premature loss of a writer whose sincerity, clear brain, and faculty of expression should have won him a distinguished place among French economists if he had lived.

C. T.

11.—*Lancashire under the Hammer*. By B. Bowker. 127 pp. The Hogarth Press, 1928. Price 3s. 6d. net.

Great Britain from Adam Smith to the Present Day: An Economic and Social Survey. By C. R. Fay. 458 pp. London: Longmans, Green & Co. 1928. Price 12s. 6d. net.

Mr. Bowker's narrative is barely half the length of a sensational novel and twice as exciting. He supports his views on the causes of the present condition of the Lancashire cotton trade with quotations from the annual number of Tattersall's *Cotton Trade Review*, Professor Daniels and Mr. Barnard Ellinger. The last chapter, "The Way Out," is for those in the trade to consider. The southerner who wisely buys the book to read in the express train will direct his thoughts to other aspects of the problem.

Professor Fay brings to his encyclopædic task the zest which comes in telling a good story to a new audience; and the English

reader already acquainted with it is conscious of an interest in the effect produced on the Canadian listener. On the title-page is the quotation from Huskisson's speech on the Civil Government of Canada in 1828:—"England cannot afford to be little. She must be what she is or nothing." The first quarter of the book is on fiscal policy and finance, and the treatment is conditioned by the sequence of governmental control. Professor Fay is at his best in the middle half, when he is able to watch and describe the sources and developments of the movements which have changed Great Britain in the last two hundred years through the efforts and genius of Englishmen and Scots. Ports and merchant shipping, roads and canals, railways and motor transport, agriculture, steam power and the engineers, the age of iron and steel, and the textile industries in transition are treated with great freshness and originality. In the last part entitled "Life and Labour," the sections on emigration and co-operation have individuality, and the history of the poor law and apprenticeship is admirably condensed in twelve pages.

No good history was ever written without an obvious bias, and this requirement is fulfilled by Professor Fay in his tendency to ignore in England's past anything which is not likely to affect Canada's future. The mariners of England and the ports on the east coast from Newcastle to Harwich receive practically no attention. No complete conception of England's social condition in the Third Georgian era can possibly be obtained by anyone who has not assimilated Crabbe and Marryat.

Professor Fay is a safe guide in the use of modern statistics, and no one will be misled by the picturesque use of eighteenth-century statistics which had either no validity or no existence. But it may be pointed out that the fact that matriculation in the University of Cambridge steadily rose from 130 in 1800 to 300 in 1815 does not prove that "the great struggle with Napoleon cut little into the life of the nation," but merely the negligibility of the university in national life.

C. E. C.

12.—*The Evolution of Industrial Organization.* By B. F. Shields, M.A. xii + 296 pp. Sir Isaac Pitman & Sons. 1926. 10s. 6d. net.

As is frequently the case with published lecture-courses, the scope of this work is less ambitious than the title appears to indicate. Professor Shields does, it is true, carry the reader into a great variety of fields, and in view of this very latitude it is perhaps unreasonable to expect too much by way of descriptive analysis.

It is not easy to understand why a work under this title should fail to describe the rise of Trade Unionism. This factor, indeed, with the forces controlling it, might have been given an interest sufficiently pervasive to lend unity to the whole; for, in their present form, the separate chapters have the appearance of being self-contained. The task of relating the various developments, Business Combination, Welfare Work, Scientific Management, to the general growth of industry is, perhaps wisely, not attempted. The author is concerned rather with describing the symptoms of struggle than with analyzing the struggle itself.

Professor Shields is conscientiously impartial: he sets out to prove nothing, and his description is therefore the more complete. On each of his several subjects he succeeds in presenting an essay which includes not only an adequate historical picture, but also a survey of the main events in countries where the development has followed different lines. If the formula is a trifle monotonous when the work is viewed as a whole, it renders each separate essay the more valuable as an introduction to the subject. From this standpoint the book possesses both the completeness and the authority expected of a standard work, and in this capacity it should prove valuable. A certain reluctance to make judicial pronouncements is not out of place in a work designed as a guide to further study, and to weave the threads of study into a complete whole would require an elaborate analysis, both historical and economic, which is outside the scope of a course of public lectures. A. P. L. G.

13.- Other New Publications.*

Aftalion (Albert). Monnaie, Prix et Changes. Expériences récentes et théorie. 353 pp. Paris: Recueil Sirey, 1927. Price 25 francs.

[Professor Aftalion's treatise is based in part upon a series of articles contributed to periodicals since 1924. The first portion consists of a statistical and historical analysis of the monetary circulation, price levels, and rates of exchange in France and other countries since 1914, and of their inter-relations during the period under review. Then follows a study of the different theories of money in their relation to recent monetary conditions, while the third part deals with foreign exchanges. The author emphasizes the importance of the psychological factors which influence prices and exchange, and develops a theory which gives full value to this aspect of the problem.]

American Economic Association. Economic Essays contributed in honour of John Bates Clark. Edited by *Jacob H. Hollander*. viii + 368 pp. New York: Macmillan, 1927. Price 17s.

[This volume has been compiled under the auspices of the American Economic Association in commemoration of the eightieth birthday of Professor John Bates Clark. It consists of seventeen essays by eminent economists, among whom may be mentioned Drs. Seligman, Irving Fisher, Benjamin Anderson, T. N. Carver, J. Bonar, and Charles Gide, the last two being the only non-American contributors. The first essay, by the Editor, is a study of Professor Bates Clark's own economic achievement; the remainder range over a wide variety of subjects in the economic field in which Professor Clark has been so distinguished a worker. Professor Hollander contributes an introductory essay on Professor Clark as an economist, and there is a bibliography of his writings. A verbatim account of the proceedings at the dinner in his honour completes the volume.]

Caprara (Ugo). Il Commercio del Grano. Parte Prima. I Mercati Esportatori. xi + 439 pp. Milan: Istituto Editoriale Scientifico, 1928. Price L. 90.

[An economic and technical treatise on the grain trade of the world with special reference to the export trade and to the methods and operations

* See also "Additions to the Library," p. 611 *et. seq.*

of grain exporters. The book deals in turn with (1) the United States and Canada, (2) Argentina, and (3) Australia, India, and Russia. In each case a close analysis is made of the technical and economic problems involved in the grain trade of the respective countries. Documents illustrating the characteristics of the trade are reproduced in appendices, and there is an index.]

Dane (Edmund), LL.B. Wages and Labour Costs. ix + 194 pp. London: Macmillan, 1927. Price 4s. 6d.

[The author of this volume endeavours to set out what he considers are the Laws which make up the true "Theory of Wages." These are termed the Quantitative Law, the Qualitative Law, the Distributive Law, and the Competitive Law. The real and lasting solution of the Wage Problem will be found, he holds, in a "reduction of the unskilled labour mass to a minimum; translation of unskilled labour into skilled labour; translation of the labourer from 'proletarian' into co-proprietor and acknowledged co-operator."

Jack (D. T.), M.A. Restoration of European Currencies, 215 pp. London: P. S. King, 1927. Price 10s. 6d.

[A discussion of the problems of stabilization, and the methods by which it has been achieved in various countries since the war, is followed by thirteen chapters devoted to the post-war monetary experience of the European countries which have rehabilitated their currencies—eighteen in all, including the four Baltic States. The course of events is followed in detail, with figures of note circulation, exchange values, price fluctuations, etc., taken from official publications or from the works of recognized authorities. The concluding chapter looks to the future, briefly discussing the possibilities of preventing excessive fluctuations in the value of gold by means of international co-operation, with especial reference to the Resolutions of the Genoa Conference of 1922. Appended are tables showing, respectively, the gold and foreign assets reserves of the chief national banks of Europe, and index-numbers of wholesale prices, both from the League of Nations Bulletin. The index is not a good one; there are no sub-headings at all. Thus, under Prices are 37 "blind" references, ranging from p. 5 to p. 215, and, on the other hand, "Sheltered prices" and "Unsheltered prices," which would scarcely be looked for under those headings, are among the entries.]

Nolan (Rev. Dom. Patrick), O.S.B., M.A. A Monetary History of Ireland. Part II. From the Anglo-Norman Invasion to the Death of Elizabeth. xl + 213 pp. London: P. S. King, 1928. Price 5s.

[Part I of this work, dealing with Ancient Ireland, was briefly noticed in the *Journal* for 1927, Part II. The present work covers the twelfth to the sixteenth centuries, and is therefore largely a study of the vicissitudes of the English monetary system and their reaction on Ireland. The author emphasizes the fact that during the greater part of the period the Irish coinage was officially and systematically debased below the English coinage and its export prohibited. The book makes a very interesting piece of history, in spite of the fact that, as explained in a somewhat violent preface, the author's main motive in undertaking it was to demonstrate the falsity of certain monetary theories, particularly those of the Cambridge school of economists.]

Schooling (Sir William), K.B.E. Moneylenders' Tables. vii + 100 pp. London: Longmans, 1928. Price 15s. net.

[The Moneylenders' Act, 1927, which came into force on the 1st January of this year, prescribes a new method of calculating interest on moneylending transactions. Sir William Schooling has compiled these tables in order

... simplify the calculations. He considers that the new methods involve unnecessary work, and makes the further criticism that whereas Section 7 of the Act declares a charge of compound interest for any loan to be illegal, the first schedule of the Act enjoins the charging of compound interest, and, moreover, leads borrowers to imagine they are paying a lower rate of interest than is the case. The tables, nine in number, are accompanied by numerous examples of their working. Extracts from the Act relating to Interest are also given |

Selekman (Ben M.). Postponing Strikes: a study of the Industrial Disputes Investigation Act of Canada. 405 pp. New York: Russell Sage Foundation, 1927. Price \$2.50.

[The working of the Canadian Act, passed in 1907, which provided for the compulsory postponement of strikes and lock-outs in mines, railroads, and other specified industries until after an investigation by an official board, is here examined with the especial view of affording guidance to the citizens of the United States in dealing with their own industrial problems. The author's verdict is unhesitatingly given in favour of the Act, and its success is ascribed mainly to the fact that its administrators have in practice ignored their powers of compulsion and have proceeded by methods of conciliation. Among important factors of success the author points to the setting up of a separate board for each enquiry as having great advantage over the constitution of a permanent court, and to the absence of any rigid code of principles. Another source of strength is that the awards are made by those who have to carry them out. The description of the Act, the methods of administering it, and the results achieved, is very clear and detailed; the initial opposition of Canadian labour and its transformation into approval, from 1918 onwards, are discussed and accounted for, and the attitude of the employers is also brought under review. The text of the book is preceded by an excellent summary of the contents of each chapter, and there is a good index. A small but irritating defect is the use throughout of the unpronounceable word "employees," for which there seems to be no justification.]

Spalding (William F.). Dictionary of the World's Currencies and Foreign Exchanges. viii + 191 pp. London: Pitman, 1928. Price 30s.

[An extremely useful book of reference, giving concisely and in alphabetical order very full information on all questions of banking and foreign exchange. Included are numerous illustrations of ancient and modern coins, a chart of money and discount rates in London during 1927 (reproduced by courtesy of Messrs. Page and Gwyther), and also a reproduction of Messrs. Pixley and Abell's table of the monthly fluctuations in London in the price of bar-silver from 1833 to 1927.]

Taylor (J. B.). Farm and Factory in China. 106 pp. London: Student Christian Movement, 1928. Price 2s. 6d.

[In this little study, the professor of Economics at Yenching University, Peking, sets out to answer, briefly and broadly, the questions raised in his foreword: What is happening to China in the sphere of industry? What does her economic transformation mean for her people, and what will be the effect of her industrial development on the world at large? The sketch of industrial conditions past and present, though slight, is informing and interesting; we learn of trade guilds and profit-sharing as part of the ancient system and of the part they have played or might play in the new order; of the evil effects of the over-rapid and unconsidered transformation which followed the introduction of Western methods—a transformation, however, which, properly guided, should ultimately ensure a higher standard of living for the working masses than was ever obtainable under the old regime. Mr. Taylor illustrates his

account with concrete instances, supports it with some useful figures, and finally discusses the methods which would be most serviceable in combating existing evils and in helping China to work out her own economic salvation.]

Valk (Dr. William L.). The Principles of Wages, 136 pp. London : P. S. King, 1928. Price 8s. 6d.

[This study was one of three which received honourable mention in competition for a prize offered by the University of Chicago in 1925 for the best original treatise on the theory of wages. The author has aimed at defining the limits set by nature to improvements in wages, and his book consists of an elaborate and industrious analysis of the principles underlying the determination of wages, in course of which he examines and appraises the various theories put forward by economists during the last fifty years. Problems of supply are excluded from his purview, and the principles underlying the determination of wages are identified with those of functional distribution in general. The conclusions which emerge are that "functional distribution is wholly determined by economic law," therefore "no artificial change" in the distribution "could be successful," and the only possible method of increasing wages is to alter the conditions so that the action of the same laws will produce a better distribution, a large aggregate product being a fundamental necessity. The book is not easy reading owing to the fact that English is not the author's native language, and his handling of it, though not incorrect, lacks vitality and incision; also the punctuation is faulty. The want of an index also detracts from the value of this painstaking and praiseworthy piece of work.]

World Population Conference, 1927. Proceedings. Edited by Margaret Sanger. 383 pp. London : Edward Arnold, 1927. Price 2os. net.

[The preliminary announcement describes the Conference as "a temporary organization . . . of the world's leading experts on the phases of the population problem : biological, social, economic, medical, statistical, and political," and the method of procedure the "presentation of carefully considered scientific essays." The meeting was held at Geneva from August 29 to September 3, 1927, under the presidency of Sir Bernard Mallet. The members of the Advisory and General Councils include representatives of the principal European countries, the United States, Australia, Argentina, Brazil, Chile, China, Japan, and Siam. The editor in her preface states that "the result of this gathering was the recognition of the need and desire for the study, and a permanent Union for the study of Population in various countries was formed. The volume contains full reports of the papers read. The first of these was by Professor Pearl on the Biology of population growth, and Professor Nieeforo followed with a short paper on the development of the Italian population. At the second session questions of optimum population and food supply were discussed by Professors Fairchild, East, Gini, and others; the third and fourth sessions were devoted to problems of fertility, birth-rates, and infantile mortality, treated by Professors Carr-Saunders, March, Gini, Grotjahn, Methorst, and Drs. Edin, Tandler, and Crew; at the fifth session, devoted to migration, the most important paper was by M. Albert Thomas on International Migration and its control; at the sixth and last, Mr. E. J. Lidbetter spoke on Heredity, Disease, and Pauperism, and Professor Lindborg and Dr. Warren S. Thompson respectively described the work of Race Biological Institutes and of the Scripps Foundation for Research in Population Problems. The opening and closing addresses by the President and others are also given in full, as is the report of the Executive Committee. Readers will be especially grateful for the excellent index, not a common feature in publications of this kind.]

CURRENT NOTES.

A considerable part of the twelve months ended 31st August, 1927, was still marked by the disorganization which followed the coal stoppage of 1926 and by the artificial activity which attended the working-off of all orders after the stoppage came to an end. There is, therefore, little advantage in comparing in detail the trade of those twelve months with the trade of the twelve months expired on 31st August, 1928. It may, however, be noted that there was an excess of imports of merchandise, coin, and bullion amounting to £365,675,000 on 31st August, 1928, which was £85,801,000 less than the excess a year earlier. An estimate of the changes in the volume of trade cannot be made with precision as the alterations in average import and export values have not been ascertained for July and August by the Board of Trade. Comparison of the calculations already made suggests, nevertheless, that the increase in exports is in the neighbourhood of 10 per cent. and that retained imports may have decreased by about 5 per cent. The recorded aggregate values show a decrease in exports from £125,571,000 to £123,063,000, or by about 2 per cent., while retained imports decreased from £562,433,000 to £487,567,000, or by about 13 per cent. In the later twelve months the entrances of vessels with cargoes were less than in the earlier period by 5,959 ships of 5,162,000 net tons; 4,236 of these ships, of 3,444,000 net tons, were British. This reduction is, no doubt, to be associated with the cessation of the abnormal imports of coal which took place during the coal stoppage and for some time afterwards. The revival of British export trade is indicated by the fact that the number of ships that cleared from British ports with cargoes in the twelve months ended 31st August, 1928, was 7,153 of 7,612,000 net tons more than in the preceding twelve months; 4,010 of these vessels of 4,047,000 net tons were British.

In the first eight months of 1928 there were exported 33,015,000 tons of coal, 5 per cent. less than the quantity exported (34,753,000 tons) in the corresponding period of 1927, but the average value fell

from about 18s. 4d. to about 15s. 8d. per ton. For the three months June to August, however, exports were nearly the same in quantity in the two years, and average export values seemed to have stabilized at about 15s. 6d. per ton. Exports of iron and steel and manufactures thereof increased from 2,679,000 tons in January-August, 1927, to 2,831,000 tons in January August, 1928; this compares with 2,665,000 tons in the first eight months of 1924 and with 2,426,000 tons in the first eight months of 1925. Unfortunately the cotton trade cannot show so good a recovery, exports of piece goods in the first eight months of the year being 2,981 million square yards in 1924, 2,999 million square yards in 1925, 2,774 million square yards in 1927, and 2,612 million square yards in 1928. The one agreeable feature is that the embargo on purchases of cotton goods in Bengal appears to have been raised, and exports to that Presidency have increased from a total of 38 million square yards in May and June to nearly 130 million square yards in July and August, an aggregate which is still 45 million square yards less than the quantity exported in these two months of 1927. Exports to China increased by nearly 43 per cent. in the first eight months of 1928 compared with exports in the corresponding period of 1927. Exports of woollen and worsted tissues increased from 112 million square yards in the first eight months of 1927 to 120 million square yards in the first eight months of 1928, China alone taking nearly 4½ million square yards more. Comparing the same periods, exports of artificial silk yarns and manufactures (except apparel) increased from £4,693,000 to £6,724,000. The quantity of artificial silk, singles yarn or straw, produced in the United Kingdom and charged with duty in the first half of the year, was 12 million lbs. in 1926, 16.5 million lbs. in 1927, and 25.2 million lbs. in 1928.

Comparing retained imports of some leading raw materials in the first eight months of 1927 and 1928, iron ore was less by about 10 per cent., but manganese ore, an important indicator of steel production, increased by a fourth in quantity. Hard wood increased from 22,876,000 cubic feet to 26,512,000 cubic feet, but soft wood decreased from 3,974,000 loads to 3,028,000 loads; this decrease suggests diminished activity in the building trade. Raw cotton declined from 10,402,000 centals to 8,592,000 centals, but heavy drafts were made on port stocks in this country. Again there was an increase in sheep's and lamb's wool from 372 million lbs. to 383 million lbs., but flax, hemp, and jute together decreased from 247,000 tons to 204,000 tons. The oil-extracting industries profited by increased supplies of raw materials, from 888,000 tons to 1,088,000 tons, and hides, both dry and wet, were in greater supply,

*Overseas Trade of the United Kingdom in the twelve months
ended 31st August, 1927 and 1928.*

| Movements and Classes | Twelve Months ended August 31, 1928. | | Twelve Months ended August 31, 1927. | | Increase (+) or De- crease (—) in later period. | |
|--|---|-------------------------|---|--------------------------|---|--------------------------|
| Imports, c i f.— | £'000. | | £'000. | | £'000. | |
| Food, drink, and tobacco | 546,216 | | 525,505 | | + 20,711 | |
| Raw materials and articles mainly un- manufactured | 342,254 | | 379,386 | | — 37,132 | |
| Articles wholly or mainly manufac- tured | 318,714 | | 328,052 | | — 9,338 | |
| Other articles | 9,950 | | 5,145 | | + 4,805 | |
| Total Imports ... | 1,217,134 | | 1,238,088 | | — 20,954 | |
| Exports, f o b — | | | | | | |
| <i>United Kingdom Produce and Manufactures—</i> | | | | | | |
| Food, drink, and tobacco | 53,771 | | 50,681 | | + 3,090 | |
| Raw materials and articles mainly un- manufactured | 71,155 | | 63,288 | | + 7,867 | |
| Articles wholly or mainly manufac- tured | 586,398 | | 535,437 | | + 50,961 | |
| Other articles | 18,243 | | 16,249 | | + 1,994 | |
| <i>Imported Merchandise—</i> | | | | | | |
| Food, drink, and tobacco | 27,403 | | 26,549 | | + 854 | |
| Raw materials and articles mainly un- manufactured | 69,738 | | 73,836 | | — 4,098 | |
| Articles wholly or mainly manufac- tured | 25,675 | | 25,027 | | + 648 | |
| Other articles | 247 | | 159 | | + 88 | |
| Total Exports ... | 852,630 | | 791,226 | | + 61,404 | |
| Bullion and Specie— | | | | | | |
| Imports | 48,660 | | 47,423 | | + 1,237 | |
| Exports | 47,489 | | 42,809 | | + 4,680 | |
| Movements of Shipping in the Foreign Trade— | Number of Vessels | Thousand Net Tons | Number of Vessels | Thousand Net Tons. | Number of Vessels. | Thousand Net Tons. |
| <i>Entered with cargoes—</i> | | | | | | |
| British | 32,381 | 40,196 | 36,617 | 43,640 | — 4,236 | — 3,444 |
| Foreign | 25,884 | 19,781 | 27,607 | 21,499 | — 1,723 | — 1,718 |
| Total entered ... | 58,265 | 59,977 | 64,224 | 65,139 | — 5,959 | — 5,162 |
| <i>Cleared with cargoes—</i> | | | | | | |
| British | 37,977 | 42,923 | 33,967 | 38,876 | + 4,010 | + 4,047 |
| Foreign | 21,694 | 20,922 | 18,551 | 17,356 | + 3,143 | + 3,566 |
| Total cleared ... | 59,671 | 63,845 | 52,518 | 56,232 | + 7,153 | + 7,613 |

the increase being from 36,000 tons to 43,000 tons. Retained imports of paper-making materials, on the other hand, decreased from 1,123,000 tons to 978,000 tons.

Wholesale prices as measured at the Board of Trade were, on the average, 0.4 per cent. higher in May than in April, the index-numbers for the two months being 86.4 and 86.1 respectively (1924 = 100). This marked the fourth consecutive increase this year. The average increases in the foodstuffs and in the industrial materials group between April and May were both equal to the general increase; in foodstuffs a marked increase of 3.5 per cent. in meat and fish was balanced by a fall of the same amount in the prices of miscellaneous foodstuffs; in the other group the most marked increase was in cotton (2.4 per cent.), while prices of iron and steel and of textiles other than cotton showed reductions. The average prices of June showed a reaction against the upward movement of the preceding months, and a reduction of 0.7 per cent. in the total index-number brought the figure to 85.8. The June index for food was lower than the May figure by 1.1 per cent., and a similar comparison in respect of industrial materials showed an average price fall of 0.4 per cent. In the various group indices the only rise of importance was that of 1.9 per cent. shown for meat and fish, this being the third consecutive monthly rise recorded in the index for that group. Cereals fell by 2.4 per cent., and miscellaneous foods by 2.6 per cent., while in the total of items other than food there were minor reductions in all the items with the exception of iron and steel and other metals and minerals, where no general change was registered. If the average for 1913 be taken as 100, the Board of Trade index number for June was 142.6, the figures for the 53 articles of food and for the 97 industrial materials being 157.5 and 134.9 respectively.

Very little change in the general level of wholesale prices was recorded by the *Economist* index-number during May. There had been a distinct rise during April, which carried the index-number at the end of that month to 183.6, the highest point since September, 1927, but during May, in spite of an increase in cereal and meat prices and a less marked increase in minerals, there was a small net reduction in the general level which brought the index figure to 183.4. This was followed by a substantial decline in June, when a reduction was recorded in each group of commodities, with the result that the total index figure fell to 179.6. At the end of December, 1927, the figure was 179.3, so that the fall in June balanced the advance in the preceding months, and the general level

of wholesale prices according to this measure ended the half-year at very much the same point where it began. This point was 54 per cent. above the level at the end of July, 1914. In this average advance on the pre-war price level, the greatest individual advance was again in subsidiary foodstuffs (83 per cent.), while minerals and the miscellaneous group were only 29 and 30 per cent. respectively higher than in July, 1914.

In the case of the *Statist* index-number of wholesale prices, the movement during May, though small, viz., 0.5 per cent., was still in an upward direction, bringing the index at the end of the month to 126.2. This prolongation of the upward tendency was, however, largely due to seasonal factors operating in the foodstuffs group, and it received a definite check during June. At the end of June the general level was reduced by 2.9 per cent. At this level the index-number (122.6) was 0.4 per cent. lower than that at the end of June, 1927, and indicated a rise of 51 per cent. in the level of wholesale prices to have taken place since the end of June, 1914. If the average prices for the whole of 1913 be taken as 100, the increase at the end of June was 44.2 per cent., which is very close to the corresponding increase measured by Bradstreet's index number for the United States at the end of May, viz., 43.2 per cent.

The increase in the general level of retail food prices in Great Britain and Northern Ireland over the July, 1914, level as measured by the Ministry of Labour, which stood at 54 per cent. on May 1, showed a slight advance to 56 per cent. on June 1. The price of potatoes showed a distinct seasonal advance, while meat and bacon also rose somewhat in price. By June 30 the average increase in retail food prices advanced still further to 57 per cent. The substitution of new crop potatoes for the old crop in the budget at this time of the year normally causes an increase in this index figure, but this year the high price of the old potatoes caused the transition to have little effect, and the slight increase recorded was mainly due to dearer eggs and bacon. When the calculation is extended to cover, in addition to foodstuffs, the level of rent, clothing, fuel and light prices and certain other household and personal supplies, it shows that on June 1 the average level of retail prices was 65 per cent. above the level of prices in July, 1914, and this same figure applied on June 30. The fact that expenditure on food accounted for 60 per cent. of the total pre-war family budget upon which this index number is constructed enables one to calculate that the average increase in the prices included, other than retail food prices, was 77 per cent. The principal items in this figure for June 30 were rent

and rates (51 per cent.), clothing (120 per cent.), and fuel and light (65 per cent.).

The following table summarises for the principal countries the latest information as to retail prices overseas as reproduced in the *Labour Gazette*. The third column gives the percentage increase in retail food prices on those ruling in July, 1914, or some similar pre-war period; the fourth column gives the estimated percentage increase for all the items covered by the budget in each case, such items, in addition to food, comprising generally rent, clothing, fuel and light and other household requirements.

| Country. | Date of latest return. | Food. | All items. |
|---------------------------------|------------------------|----------------------|----------------------|
| | | Percentage increase. | Percentage increase. |
| <i>Overseas Dominions, etc.</i> | | | |
| Australia | May, 1928 | 54 | 47 (1st qr.) |
| Canada | May, 1928 | 47 | 55 |
| India (Bombay) * ... | June, 1928 | 42 | 45 |
| Irish Free State ... | April, 1928 | 62 | 70 |
| New Zealand | May, 1928 | 47 | 62 |
| South Africa | May, 1928 | 20 | 33 |
| <i>Foreign Countries.</i> | | | |
| Belgium | June, 1928 | — | 711 |
| Czechoslovakia (Prague)... | May, 1928 | 808 | 636 |
| Denmark | April, 1928 | 52 | 76 |
| Egypt (Cairo) | March, 1928 | 39 | — |
| France (Paris) | June, 1928 | 457 | 419 (2nd qr.) |
| France (other towns) ... | May, 1928 | 430 | — |
| Germany | June, 1928 | 52 | 51 |
| Holland (Amsterdam) ... | March, 1928 | — | 69 |
| Italy (Milan) | April, 1928 | 416 | 431 |
| Norway | June, 1928 | 71 | 93 |
| Spain (Madrid) | May, 1928 | 71 | — |
| Sweden | July, 1928 | 57 (June) | 73 |
| Switzerland | May, 1928 | 56 | 60 |
| United States | May, 1928 | 51 | 72 (Dec., 1927) |

* Native families.

With reference to statistics relating to employment in Great Britain and Northern Ireland, quoted on p. 440 of Part III of the *Journal*, the *Labour Gazette* recorded a continuous slight decline in the volume of employment during May and June. Among the workpeople (aged 16 to 64 inclusive, and numbering approximately 11,800,000) insured against unemployment under the Unemployment Insurance Acts in Great Britain and Northern Ireland, the percentage unemployed (including those temporarily stopped as well as those wholly unemployed) in all industries taken together was 9.9 on May 21, as compared with 9.6 on April 23. By June 25,

the percentage had increased to 10·8, which compared with 8·8 on June 20, 1927. The total number of applicants for employment registered at Employment Exchanges in Great Britain and Northern Ireland on May 21 was approximately 1,143,000; on June 25 it was 1,239,000, which was considerably in excess of the figure for a year before, viz., 1,032,000 on June 27, 1927.

Official statements as to employment in Germany, quoted from the *Reichsarbeitsblatt* by the *Labour Gazette*, showed a marked seasonal improvement in the position during April and May. At the end of April the Employment Exchanges making returns reported 1,385,317 persons on the "live register" as against 1,673,121 at the end of March; at the end of May the number was further reduced to 1,246,457, which was also less than the figure for a year before, viz., 1,362,418. Returns received from national trade unions with a total membership of over 4,250,000 also showed a steady shrinkage of the percentage of unemployment from 9·2 at the end of March to 6·3 at the end of May; this last figure compares with 7 per cent. for the end of May, 1927. In France also there was a seasonal reduction of unemployment during May and June, the total number of persons remaining on the "live register" of the exchanges falling from 18,420 at the end of April to 9,124 at the end of June. In the case of Norway the trade union percentage of unemployment showed a much less marked rate of reduction, from 20·5 at the end of February to 18·5 two months later, but the latter figure showed quite a favourable comparison with 23·8, the percentage of unemployment at the end of April, 1927. For Swedish trade unions, returns are quoted by the *Labour Gazette* up to the end of May, when the percentage of unemployment stood at 8·1, as compared with 13·1 at the end of March and 10 at the end of May, 1927. In the third Scandinavian kingdom, returns supplied to the Danish Statistical Department by trade unions and by the Central Employment Exchange showed that 14·3 per cent. of the workers covered by the returns were unemployed at the end of May; this figure represented an improvement on that for a month before (17·6 per cent.), as also on that for a year before (19·1 per cent.). The Journal of the Dutch Statistical Office publishes figures showing that out of 291,186 members of subsidised unemployment funds making returns for the last week of May, 3·8 per cent. were unemployed during the whole week and 1 per cent. for less than 6 days. In the last week of April the percentages were respectively 3·7 and 1·2.

In Canada the index-number of employment is now based upon returns received from over 6,500 firms with an aggregate of over 943,000 on their pay-rolls. If the volume of employment in the week ended January 17, 1920, be represented by 100, the index number of employment for May 1 was 105.5, and that for June 1 was 112.4, as compared with 105.9 on June 1, 1927. On April 30, 1928, 5.2 per cent. of the aggregate membership of Canadian trade unions making returns were unemployed, as against 6.5 per cent. a month before and 6.0 per cent. a year before.

The monthly report on employment issued by the Federal Department of Labour Statistics at Washington is now based upon returns received from 10,790 establishments in 54 of the chief manufacturing industries, and covers over 3 million workpeople. If the monthly average index-number of employment in manufacturing industries in 1923 be taken as 100, the corresponding figure for May, 1928, was 85.5, as compared with 85.7 for April, and 89.7 for May, 1927.

The report of the Electricity Commission on Electricity Supply in 1925-6 (Stationery Office, 1928, price 12s. net) contains full particulars of all the undertakings supplying electricity in Great Britain. Local authorities owned 277 stations with an aggregate installed capacity of 2,969,300 kw., and companies 214 stations with a capacity of 1,452,300 kw.; together 491 stations and 4,421,600 kw. Steam turbine plant alone accounted for 4,096,000 kw., and 91.6 per cent. of all the plant was for alternating current. Altogether 6,618.6 million units were generated, 4,348 millions by local authorities and 2,270.6 units by companies; in the total there was an increase of about 10 per cent. on 1924-5. About 308 million units were purchased from outside sources (railways, tramways, collieries, etc.), making the gross public supply 6,926.3 million units, of which 19.1 per cent. was used on the works or lost in transmission and 5,606.1 million units were sold to consumers—1,244.5 millions for lighting and domestic supplies, 89.7 millions for public lighting, 511.8 millions for traction, and 3,760.1 millions for power. Over 70 per cent. of 523 undertakings analysed had not reached a stage of development corresponding to an annual sale of 100 units per head of population. "The ratio of the aggregate maximum loads on generating plant in 1925-6 to the total capacity of the generating plant installed by authorized undertakers at the end of that period was of the order of 100 : 173, thus indicating a plant capacity of some 73 per cent. in excess of the maximum demand upon it." The fuel consumed was 7,026,000 tons, *i.e.*, coal and coke, and fuel oil

expressed as "equivalent coal," or 2.43 lbs. per unit generated (in 1921-5 the average was 2.55 lbs.); of the total 7,000,000 tons were coal and coke. Total capital expenditure to the end of 1925-6 was £217 million, 43.9 per cent. on generation and 56.1 per cent. on transmission, distribution, etc.; the average capital expenditure on generation alone was £21.5 per kilowatt installed. The aggregate revenue was £42,961,000 or 1.66 pence per unit sold, as compared with £40,914,000 or 1.76 pence per unit sold in 1924-5; inter-sales were £2,017,000 in 1925-6 and £1,740,000 in 1924-5. The revenue from working has fallen from £24.6 per £100 of capital expenditure in 1921-2 to £19.8 in 1925-6, while the sales of electricity per £100 of capital increased progressively from 2,189 units in 1921-2 to 2,624 units in 1924-5, but declined slightly in 1925-6 to 2,583 units; over the period the charges for electricity sold have been reduced. Working expenses in 1925-6 were £24,493,000, or 0.94 pence per unit sold; in 1921-2 working expenses were 1.73 pence per unit sold. The cost per unit generated in 1925-6 was 0.40 pence, of which 0.24 pence was for fuel. The total number of persons employed in 1925-6 was 45,284, of whom 17,806 were employed on generation, 20,232 on distribution, and 7,246 on administration: the wages and salaries bill amounted to £7,979,000.

The Forestry Commission have now published (Stationery Office, 1s. 9d. net) a "Census of Woodlands and Census of Production of Home-Grown Timber, 1924," which contains some matters of importance. The total area of woodland in Great Britain was returned as nearly 2,959,000 acres, a figure which cannot be compared with that shown in previous Censuses on account of the inclusion therein of scrub formerly excluded. The total area, economic or potentially productive, was nearly 2,755,000 acres, viz., 1,417,000 acres high forest, 529,000 acres coppice, 331,000 acres scrub, and 478,000 acres felled or devastated, while amenity woods, shelter-belts, and other uneconomic timber covered 204,000 acres. In high forest there were 672,000 acres of conifers, 443,000 acres of hardwoods, and 302,000 acres of mixed conifers and hardwoods. In Scotland 78.1 per cent. of the high forest consisted of conifers, 11.1 per cent. of hardwoods, and 10.8 per cent. of mixed woods; in England the percentages were respectively 25.9, 44.9, and 29.2 per cent., and in Wales they were 41.5, 38.9, and 19.6. About 53.2 per cent. of the high forest area was in England, 8 per cent. in Wales, and 38.7 per cent. in Scotland. As to future supplies of timber, the Commissioners' conclusions are: "Conifers. There should be forthcoming a small but steady supply of softwood timber. As the

Commissioners' afforestation programme progresses and as felling with replanting takes place, the youngest age-class will gradually predominate, but can have little effect for 20-30 years in augmenting the annual supply and reserves of timber.—Hardwoods. There should be no difficulty in maintaining for some time the existing output of hardwoods, but at the present rate of planting the supply must inevitably decline in due course to an insignificant quantity." "The economic or potentially productive woodlands are estimated to contain in all about 2,262 million cubic feet of timber and pitwood."

The Census of Home-Grown Timber Production was undertaken as part of the general Census of Production of 1924. The method adopted was one of samples, 262 estates, covering 11·3 per cent. of the woodland area, being selected as representing average conditions of management. "In order to obtain the total production for Great Britain, each type of woodland was considered separately for England, Wales and Scotland respectively, the procedure being to raise the production as disclosed by the sample areas in the proportion total area of the type in the country/total area of the type in the samples. The production from the Crown woods was excluded from these calculations and added subsequently." The total amount of timber felled or sold for felling (saw-timber, pitwood, firewood, etc., whether sold or used on estates) was 55,985,000 cubic feet, valued at £2,036,000. The production was divided into: Conifers, 24,501,000 c. ft. (£702,300); Hardwoods, 12,755,000 c. ft. (£621,800); Mixed Woods, 6,065,000 c. ft. (£273,500); Coppice, 8,548,000 c. ft. (£282,100); Hedgerow Timber, 1,707,000 c. ft. (£77,400); Un-economic and other Timber, 2,409,000 c. ft. (£79,000). Over half the hardwoods were oak (12,786,000 c. ft., £641,000). Another classification is: Sawmill Timber, 39,311,000 c. ft.; Pit-props, 4,875,000 c. ft.; Firewood, 7,512,000 c. ft.; Other Timber, 4,287,000 c. ft. England was responsible for 65·3 per cent. of the value, Wales for 7·1 per cent. and Scotland for 27·6 per cent. The total number of persons permanently employed was 19,220, while those temporarily employed ranged during the year from a minimum of 4,090 to a maximum of 10,000.

The Irish Free State, being unable to participate in the Census of Production of 1924 for Great Britain and Northern Ireland, took a Census of its own for the year 1926. A series of Preliminary Reports is now being issued in mimeographed form, and copies can be obtained from the Statistics Branch, Department of Industry and Commerce, Lower Castle Yard (South), Dublin. Nine reports have, so far, been

issued, dealing with the following trades: Woollen and Worsted Industry, Malting, Whiskey Distilling, Brewing, Fertilizers, Tobacco, Soap and Candles, Paper-making and Manufactured Stationery, and Printing, Publishing, Bookbinding and Engraving. The general lines of the Census of Production for the United Kingdom have been followed, but under the more extensive powers conferred by Free State legislation it has been possible to collect compulsorily a quantity of information which the Board of Trade could only ask manufacturers to supply voluntarily. Thus, in the report on the Woollen and Worsted Industry the quantities and costs of materials used are given under 14 headings instead of in one value total only. The amounts paid in salaries and wages are shown separately; particulars as to the machinery (spindles and looms) installed are given; the number of days worked in the year and the number of hours worked in the week and the persons so employed are stated. Under the British Census of Production Act information as to wages, salaries and machinery could not be required; while in 1924 questions as to days and hours worked were left to the Ministry of Labour. The total net output of the nine trades so far dealt with is £12,373,000, to which Brewing contributed £8,685,000, Tobacco £1,129,000, and Printing, etc., £1,344,000, but the net output for Brewing included £3,500,000 for duties not covered by the cost of materials. The total wage-bill was £2,001,000, and £948,000 were paid as salaries; both these amounts come out of net output. The aggregate number of wage-earners was 14,341 and there were 3,303 proprietors and salaried staff. The effective horse-power of prime movers installed at the factories aggregated 17,550 h.p.; in addition there were electric motors with a total rated horse-power of 3,678 h.p. driven by purchased electricity.

The Rudolf Mosse Buchverlag of Berlin have now completed the issue of a new encyclopædia of statistics in seven volumes, *Die Welt in Zahlen*, by Wl. Woytinsky. The volumes deal respectively with:— I. The World, Population, National Wealth; II. Labour; III. Agriculture; IV. Industry; V. Trade and Transport; VI. The State; VII. Data of Political and Moral Statistics (criminal, health, and electoral statistics). The author sets out his aim as follows:— “It is both possible and necessary to set forth the results of statistical enquiries, even the most complicated, in popular language, easily to be understood. It is possible and necessary to introduce everyone to the sphere of statistical data, to give everyone an understanding of the language of figures, and to lead everyone to a reasoned and critical attitude towards statistics; that not least of all implies the setting the figures of to-day (often exaggerated by political strife)

in a true relation to figures rooted in the past." The trouble with such encyclopædias as the present, whose issue runs over several years—in this case 1925 to 1928—is that they never can be up-to-date. The changes in the post-war period have been so swift that data relating to 1924 or earlier years may be of little use in interpreting the present. It is, however, a considerable merit that this work has been produced not in dictionary form, but in a series of compendiums, divided according to their subject. When one man undertakes so large a task he is under the temptation to use second-hand instead of first-hand sources, and thus runs an additional risk of not being abreast of the latest information. Thus on p. 31 of Vol. IV (published in 1926) a table is given showing for the United States by industries the number of workpeople, the capital, and the net output for four years, the latest of which is 1919. This table is based on the Statistical Abstract of the United States for 1922, and yet the Report on the Biennial Census of Manufactures for 1921 was available, as it had been issued in 1923. The commentary appears generally to be fair except when the author is betrayed by the lust for a purple patch, as when he says on p. 1 of Vol. IV.: "The biennial Censuses of Manufactures, which are the pride of American statistics, are an unattainable luxury for Europe; on that point one need only refer to the fact that Great Britain in 150 years of capitalist expansion has only once, in 1907, carried out a census of industrial undertakings." The point is quite a good one, except that the author omits to state that the second Census (1912) was interrupted by the war and that the third Census (1924) was being taken as he wrote.

At the Annual General Meeting the Chairman announced that a Guy Medal in silver had been awarded by the Council to Miss E. M. Newbold for her paper on the Practical Application of the Statistics of Repeated Events, particularly to Industrial Accidents, read before the Society in April, 1927. This is the first time that the medal has been gained by a woman, Miss Newbold's paper being the seventh to be read by a woman. In this connection it is of some interest to note that there are now twenty-one women Fellows, of whom three are members of Council. Before 1879 Florence Nightingale was the single representative of the sex; another, Mrs. Lovegrove, joined that year, but died in 1885; in the next decade two more women were elected, and in 1914 the total number was five.

The Director of the International Labour Office (League of Nations), Geneva, announces that a selection will shortly be made to fill the post of Chief of the Statistical Section of that Office. The

post is open to candidates of both sexes in all States which are Members of the International Labour Organization. The salary is 28,000 Swiss francs per annum, rising by annual increments of 1,000 francs to a maximum of 33,000 francs; subject to modification in accordance with fluctuations in the cost of living at Geneva, which at present produces a reduction of 2.6 per cent. on this amount. Candidates' age must not be more than 45 or less than 30 on 31st December, 1928.

Particulars of the qualifications required, of the documents and information which should accompany an application, and of the general conditions of service in the International Labour Office, may be obtained from the London Branch of the International Labour Office, 12 Victoria Street, London, S.W. 1. Requests for these particulars should be accompanied by a stamped and addressed foolscap envelope.

As the *Journal* goes to press we regret to receive the news of the death of our valued colleague, Mr. Augustus Sauerbeck. Mr. Sauerbeck joined the Society in 1886, and was elected an Honorary Fellow in 1920. He read two papers on Prices, the first in 1886 and the second, for which he was awarded a Guy Medal in silver, in 1894; and for twenty-five years in succession he himself contributed the review of Wholesale Prices, which appears annually in the *Journal*. Time does not permit of a full account here of Mr. Sauerbeck's activities, but it is hoped to include a biographical notice in our next issue.

STATISTICAL AND ECONOMIC ARTICLES IN RECENT PERIODICALS.

UNITED KINGDOM—

- Accountants' Magazine*, July, 1928—Agricultural credit. Stock Exchange procedure: *W. Dickison*.
- Annals of Eugenics*, April, 1928—Fresh evidence on the inheritance factor in tuberculosis. Part II: *Percy Stocks*, assisted by *M. N. Karn*. On the relative value of the factors which influence infant welfare: *E. M. Elderton*. Influence of age and environment on parental health and habits: *E. M. Elderton*. Infant mortality in the metropolitan boroughs: *Percy Stocks*.
- Bankers' Magazine*—
- July, 1928—The banking half-year. The financial outlook. National and local expenditure: *Rt. Hon. William Graham*.
- August, 1928—Progress of banking in Great Britain and Ireland during 1927. The financial outlook. The bank balance sheets.
- September, 1928—Bankers and credit problems: *F. G. Culmer*. Tariffs and trade: *F. Morris*.
- Biometrika*, July, 1928—On the need for standardization in measurements on the living: *P. C. Mahalanobis*. The generalized product moment distribution in samples from a normal multivariate population: *J. Wishart*. Frequency distribution of an index when both the components follow the normal law: *A. S. Werrill*. On the examination of final digits by experiments: *C. P. Sun*. On a method of ascertaining limits to the actual number of marked members in a population of given size from a sample: *K. Pearson*. On the use and interpretation of certain test criteria for purposes of statistical inference. Part I: *J. Neyman* and *E. S. Pearson*.
- East India Association, Journal*, July, 1928—Indian reform and the Simon Commission: *Maharajadhiraja Bahadur of Burdwan*.
- Economic Journal*, September, 1928—The instability of capitalism: *J. Schunpeter*. The Indian Reserve Bank and Sir B. Blackett's work in India: *A. J. Saunders*. Business forecasting: *J. H. Jones*. The United States balance of trade in 1927: *J. M. Keynes*.
- Economica*, June, 1928—Theories of banking policy: *D. H. Robertson*. Wage-fixing in the building industry: *J. R. Hicks*.

UNITED KINGDOM—*Contd.*

- Eugenics Review*, July, 1928—Income-tax rebates: *R. A. Fisher*.
The kin of genius: *W. T. J. Gun*. Jews and Gentiles: *G. Hughes*. Natural and social selection: *F. W. White*.
- Financial Review of Reviews*, July-September, 1928—Funding of the war loans: *A. Wright*. Electricity and gas. The new national scheme: *E. T. Good*. British iron and steel finance: *W. Walker*. Financial and political conditions in France: *S. de Bullinski*. The resources and development of Brazil: *A. Mercer*.
- Institute of Actuaries, Journal*, July, 1928—Notes on the new national life tables (1921 census): *J. Murray Laing*. Notes upon experiments with actuarial functions and Fourier's series: *T. F. Anderson*.
- Ministry of Agriculture, Journal*—
July, 1928—An interesting West Riding farm: *A. G. Ruston*.
Some sugar beet costs: *E. G. Strutt* and *W. Gavin*.
September, 1928—Development of agricultural education in Norway: *J. Sebelien*.
- Public Administration*—July, 1928—Contents include a symposium of twelve papers.
- Royal Sanitary Institute, Journal*—
July, 1928—Infant mortality in the city of Worcester from 1885-1925: *Mabyn Read*. Twenty years' experience of sanitary progress in India: *F. C. Temple*.
September, 1928—The present position of the tuberculosis problem: *F. J. H. Coultts*, *M. Paterson*, *J. A. Dixon* and *E. Ward*.
- Tropical Agriculture*—
August, 1928—The oil palm industry: *F. J. Martin*.
September, 1928—Malaya Rubber Institute: *G. Bryce*.

UNITED STATES—

- American Academy of Political and Social Science, Annals*, July, 1928—Some aspects of the present international situation. A series of articles by various authors.
- American Statistical Association, Journal*, June, 1928—The statistician's place in public health work: *E. Sydenstricker*. On moving correlation of time sequences: *S. Kuznets*. Long-time guarantees of prosperity: *R. M. Davis*. Small samples—new experimental results: *W. A. Shewhart* and *F. W. Winters*. The index of volume of trade: second revision: *C. Snyder*. The graphical construction of moving averages: *R. McChesney*. The probable error of the standard deviation: *J. R. Harris* and *M. M. Ness*.
- Harvard Business Review*, July, 1928—An analysis of the causes and results of hand-to-mouth buying: *F. E. Clark*. Business life insurance: *A. L. Bishop*. Cost control in banks: *T. H. Sanders*.

UNITED STATES—*Contd.*

Journal of Political Economy—

June, 1928—The trend of agricultural exports: *E. G. Nourse.*

The general theory of price: *F. H. Knight.*

August, 1928—Nationalism and economic theory: *J. E. Moffat.*

Economic effects of the Black Death: *H. Robbins.* Correlations between prices and yields: *V. P. Timoshenko.*

Monthly Labor Review—

June, 1928—Settlements for accidents to American seamen.

Blast-furnace productivity in the United States: *E. Stewart.*

July, 1928—Industrialization of the feeble-minded: *E. Stewart.*

Quarterly Journal of Economics, August, 1928—The rate of interest, the bank rate, and the stabilization of prices: *G. Cassel.* Cost and its relation to value: *A. E. Monroe.* Cyclical fluctuations in agriculture and industry in Russia 1869–1926: *S. A. Pervushin.* The Colwyn Committee and the incidence of income tax: *T. R. Snavely.* The index of the general price level: *C. Snyder.*

Review of Economic Statistics, May, 1928—The theory of economic cycles based on the tendency toward excessive capitalization: *M. Bouniatian.* The effect of correlation between weights and relatives in the construction of index-numbers: *W. M. Persons.*

ARGENTINA—

Revista de Ciencias Económicas, May, 1928—El plan brasiliéno de retorno al patrón oro: *F. Fetter.* Discusión del sistema de ecuaciones que define el equilibrio del consumidor: *L. Amoroso.*

EGYPT—

L'Égypte Contemporaine, April, 1928—Les apports des sciences sociologiques aux problèmes économiques: *G. Hostelet.* Le nitrate de soude du Chili et son emploi dans l'agriculture égyptienne: *J. Anhoury.*

FRANCE—

Journal des Économistes, July, 1928—La nouvelle loi monétaire française: *E. Payen.* Le commerce extérieur des principales nations en 1927: *R. J. Pierre.* La fraude fiscale et l'histoire: *C. Rosier.*

La Réforme Sociale—

May, 1928—Société d'économie sociale.

June, 1928—Monographie d'une famille ouvrière de Lorraine. Observations préliminaires. L'Organisation de la production et son rôle social (suite): l'Union des Industries Métallurgiques et Minières.

FRANCE—Contd.

Revue d'Économie Politique—

May-June, 1928—La France économique. Annuaire pour 1927.

July-August, 1928—Le conseil national économique: *C. Gide*. Une théorie de l'inflation de crédit comme substitut à la théorie quantitative de la monnaie: *V. Milschuh*. La loi des rendements non proportionnels. Son évolution et ses derniers perfectionnements: *P. Fromont*. La vie économique en Allemagne: *H. Laufenburger*.

GERMANY—

Weltwirtschaftliches Archiv, July, 1928—Produktivität: *W. Sombart*. Das intertemporale Gleichgewichtssystem der Preise und die Bewegungen des "Geldwertes": *F. A. v. Hayek*. Entwicklungsgeschichte der monetären Konjunkturtheorie: *F. Burchardt*. Über Cassels System der theoretischen Sozialökonomie: *K. Diehl*. Die Ermittlung der Werterhöhung in der Produktionsstatistik. *J. P. Gheertschuk*.

HUNGARY—

Revue de la Société Hongroise de Statistique, April-June, 1928—Le marché du crédit en Hongrie: *C. Kriesz*.

ITALY --

Le Assicurazioni Sociali, Anno IV. No. 3—La disciplina nazionale della domanda e dell' offerta di lavoro: *On. G. Polverelli*. Su alcuni criteri specifici di valutazione nell' assicurazione d'invalidità: *E. Sorrentini*.

Bollettino dell' Istituto Statistico-Economico, May-June, 1928—I bilanci delle grandi banche germaniche: *L. Sanzin*. L'industria cotoniera giuliana: *U. Citter*. Lo sviluppo dell' aviazione civile in Germania: *E. Donnersberg*.

Giornale degli Economisti e Rivista di Statistica—

June, 1928—Inflazione e prezzi in Russia prima della riforma monetaria bolcevica: *J. G. Kretschmann*. Media aritmetica e media geometrica nel calcolo dei numero indici dei prezzi all'ingrosso: *G. Tagliacarne*. Sulla tassazione del risparmio: *R. Fubini*.

July, 1928—Considerazioni sui "Barometri" economici: *G. Bresciani-Turroni*. Primo congresso nazionale di scienza delle assicurazioni: *F. Insolera*.

La Riforma Sociale, July-August, 1928—La Borsa di New York e il riesame del "Federal Reserve System": *A. Cabiani*. Dazi doganali e preferenza imperiale in Inghilterra: *B. Foa*.

JAPAN

Kyoto University Economic Review, July, 1928—On the taxpayer: *M. Kambe*. Changes of social classes during the Tokugawa period: *E. Honjo*. Characteristics of tariff freight rate in the shipping business: *S. Kojima*.

ROUMANIA—

L'Économiste Roumain, July, 1928—Les vingt-cinq premiers articles importés par la Roumanie en 1925 et leurs pays d'origine : *Ing. G. Ioamțiu*.

SWEDEN—

Ekonomisk Tidskrift, Häft 2-3, 1928—Aktuella problem : *D. Davidson*. Kooperation och ekonomi : *H. Stolpe*.

SWITZERLAND—

Zeitschrift für Schweizerische Statistik und Volkswirtschaft, Heft 2, 1928—Konjunkturbeobachtung : *K. Pribram*. Konjunkturpolitik : *M. Saitzew*.

INTERNATIONAL—

L'Avenir du Travail, August, 1928—Le contrôle du crédit et de la monnaie : *Irving Fisher*. La durée et le rendement du travail : *H. M. Vernon*.

International Labour Review—

July, 1928—Seasonal unemployment in the clothing industries : I. Co-operation and monopolies in Sweden : *H. Stolpe*. The regulation of hours of work in European industry : I.

August, 1928—The eleventh session of the International Labour Conference. Seasonal unemployment in the clothing industries : II. The regulation of hours of work in European industry : II.

LIST OF ADDITIONS TO THE LIBRARY.

Since the issue of Part III, 1928, the Society has received the publications enumerated below :—

I.—OFFICIAL PUBLICATIONS.

(a) United Kingdom and its several Divisions.

United Kingdom—

Labour, Ministry of. Report of an enquiry into apprenticeship and training for skilled occupations in Great Britain and Ireland. VII. General Report. 194 pp. London, 1928. 5s. (H.M. Stationery Office.)

Overseas Trade, Department of—

Reports on financial and economic conditions, etc., as follows: Portugal, with notes on the financial situation in Angola and Mozambique, 1s. 6d.; Roumania (March, 1928), 2s.; Serb-Croat-Slovene Kingdom (Jugo-Slavia) (May, 1928), 1s. 6d.; Syria, 1s. (The Department.)

England and Wales—*Health, Ministry of—*

Public health and medical subjects. No. 53. Outbreak of paratyphoid fever in Hertfordshire. 16 pp. London, 1928. 3d. (The Ministry.)

Vaccination. Report of the committee. 324 pp. London, 1928. 7s. (*Id.*)

Industrial Fatigue Research Board. Report No. 51. A study of absenteeism in a group of ten collieries. iv + 68 pp. London, 1928. 2s. 6d. (H.M. Stationery Office.)

Northern Ireland—

Census, 1926. Counties: Londonderry, xxv + 64 pp.; Tyrone, xxii + 78 pp. Belfast, 1928. 5s. each. (Registrar-General.)

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(b) India, Dominions and Protectorates.

India —

Gazetteers—Agra and Oudh. Vol. XXXVII. Mirzapur Dist. xxxvi pp. Allahabad, 1927. 12 as.; Burma. Mandalay Dist. Vol. A. ix + 257 pp. Rangoon, 1928. 11s. 3d.; Sind. B. Vol. III. Sukkur Dist. iv + 162 pp. Bombay, 1928. 11s.

Ceylon. Handbook Supplement (1927). Commercial and general information for Ceylon, 1926. vii + 82 pp. Colombo, 1928. Rs. 1.50. (Director of Statistics.)

Irish Free State—

Industry and Commerce, Department of. Census of production, 1926.

Preliminary reports—Nos. 1. Woollen and worsted industry, 10 fol. pp.; 2. Malting industry, 5 fol. pp.; 3. Whiskey distilling industry, 4 fol. pp.; 4. Brewing industry, 6 fol. pp.; 5. Fertilizer industry, 5 fol. pp.; 6. Tobacco industry, 6 fol. pp.; 7. Soap and candle industry, 4 fol. pp.; 8. Paper-making and manufactured stationery industry, 4 fol. pp.; 9. Printing, publishing, bookbinding and engraving industry, 5 fol. pp. (Typed copies.) 1928. (The Department.)

(c) Foreign Countries.

Bulgaria—

Statistique des élections des députés pour la xxième assemblée nationale ordinaire. 96 pp. Sofia, 1928. 190 lévas. (Direction Générale de la Statistique.)

Recensement de la population, 1920. Tome IV. 115 pp. Sofia, 1928. 200 lévas. (*Id.*)

France—

Résultats statistiques du recensement général. 1926. Tome I. Partie I. Population légale ou de résidence habituelle. 142 pp. Paris, 1928. (Statistique Générale.)

Statistique du mouvement de la population. 1925. Nouvelle série. Tome V. Partie I. Mariages, divorces, naissances, décès. xxx + 29 pp. Paris, 1928. (*Id.*)

Germany—

Statistik des Deutschen Reichs—

Band 315. Die Wahlen zum Reichstag am Mai und am Dezember 1924. Einzeldarstellungen zu den Reichswahlen und -Abstimmungen 1924 bis 1926. 66 pp. Berlin, 1928. (Statistisches Reichsamt.)

Band 403-405. Volks-, Berufs- und Betriebszählung vom Juni, 1925. Berufszählung. Pommern, Grenzmark, Posen-Westpreussen, Sachsen, Thüringen, Anhalt, Schleswig-Holstein, Hannover, Westfalen, Rheinprovinz, Hamburg, Mecklenburg-Schweien, Oldenburg, Braunschweig, Bremen, Lippe, Mecklenburg-Strelitz, Schaumburg-Lippe, Sueddeutschland und Hessen. 19 vols. Berlin, 1928. (*Id.*)

Mannheim. Mannheim: das Kultur- und Wirtschaftszentrum Südwestdeutschlands. clix + 139 pp. Mannheim, 1928. (Oberbürgermeister.)

Oldenburg. Statistische Nachrichten über den Freistaat Oldenburg, Heft 9 und 10. Die Ergebnisse der Volks-, Berufs- und Betriebszählung am Juni 1925. vi + 219 pp. Oldenburg, 1928. 6 Reichsmark. (Statistisches Landsamt.)

Italy—

Annuario statistico della emigrazione Italiana dal 1876 al 1925. xxi + 1740 pp. Rome, 1928. (Ministero degli Affari Esteri.)

Jugo-Slavia—

Agriculture, Ministry of. Consumption of cereals in Jugo-slavia. viii + 139 pp. Belgrade, 1928. (The Ministry.)

Poland—

Le premier recensement général, 1921. Bâtiments. 92 pp. Warsaw, 1928. (L'Office Central de Statistique.)

Roumania—

Loi du classement des céréales. 16 pp. Bucarest, 1928. (Ministère de l'Agriculture et des Domaines.)

Russia—

Central Statistical Office—

Population de l'U.R.S.S., 1926. Groupes ethniques, langues, âge, instruction. Vol. I. Région du Nord, Territoire de Léninegrad et République Aut. de Carélie. viii + 303 pp.; Vol. X. R.S.S. de la Bélorussie. v + 289 pp. Moscow, 1928. (The Office.)

Plan général de la statistique de l'État pour l'année 1927-28. viii + 112 pp. Moscow, 1928. (*Id.*)

Conjuncture Institute—

Problems of economic conditions. (Supplement to the Monthly Economic Bulletin of the Institute.) Vol. I. Moscow, 1925.

Farmers' Indices. Ed. Prof. N. D. Kondratieff. 96 pp. Moscow, 1927. (In Russian.)

(c) Foreign Countries—*Contd.***Sweden—**

Statistik undersökning av statstjänstemannens bisysslor. 90 pp. Stockholm, 1928. (K. Socialstyrelsen.)

Turkey—

Population de la Turquie par vilayets et cazas par villes et villages d'après le recensement du Oct. 1927. 28 pp. Angora, 1928. (Office Central de Statistique.)

United States—*Agriculture, Department of—*

Circular No. 26. Comparison of puro-bred and grade dairy cows. 6 pp. 1928. 5 cents. (The Department.)

Department Bulletin No. 1496. Timber growing and logging practice in the Lake States. 63 pp. 1928. 20 cents. (*Id.*)

Farmers' Bulletin No. 15. Systems of live-stock farming in the black prairie belt of Alabama and Mississippi. 34 pp. 1928. 10 cents. (*Id.*)

Miscellaneous Publication No. 12. Workers in subjects pertaining to agriculture in state agricultural colleges and experiment stations, 1927-28. 139 pp. 1928. 20 cents. (*Id.*)

Statistical Bulletin No. 22. Vegetable statistics for year ended 1926, with comparable date for earlier years. 268 pp. 1928. (*Id.*)

Technical Bulletins. Nos. 40. Agricultural co-operative associations.

Marketing and purchasing, 1925. 97 pp. 20 cents. 45. A study of ranch organization and methods of range-cattle production in the northern great plains region. 91 pp. 20 cents. 67. Silt in the Colorado river and its relation to irrigation. 94 pp. 20 cents. 70. The combined harvester-thresher in the great plains. 60 pp. 1928. 15 cents.

Immigration and Naturalization, Committee on. Extracts from hearings before the Committee. 7th congress. 1st session. American history in terms of human migration. 21 pp. 1928. (Eugenics Record Office.)

Labor, Department of. Children's Bureau. Publication No. 182. Welfare of prisoners' families in Kentucky. 50 pp. 1928. 10 cents. (The Department.)

Labor Statistics, Bureau of. Bulletins, Nos. 456 (Workmen's insurance and compensation series). Proceedings of the 14th annual meeting of the International Association of Industrial Accident Boards and Commissions, 1927. vi + 257 pp. 1928. 457 (Wages and hours of labor series). Union scales of wages and hours of labor, 1927. 233 pp. 1928. 35 cents. 458 (Miscellaneous series). Health and recreation activities in industrial establishments, 1926. iv + 94 pp. 1928. 25 cents. 459 (Miscellaneous series). Apprenticeship in building construction. v + 133 pp. 1928. 20 cents. 460 (Industrial accidents and hygiene series). A new test for industrial lead poisoning. 33 pp. 1928. 10 cents. (The Bureau.)

(d) International.

League of Nations—*Economic and Financial Section—*

Economic Committee. Report to the Council on the work of the 25th session. 7 fol. pp. 1928. (The League.)

Financial Committee. Report to the Council on the work of the 31st session. 7 fol. pp. 1928. (*Id.*)

Meeting of the government representatives to consider the question of the export of hides, skins and bones. 46 fol. pp. 1928. (*Id.*)

International agreement relating to the exportation of hides and skins. (With protocol and final act.) 22 fol. pp. 1928. (*Id.*)

International conference for the abolition of import and export prohibitions and restrictions. Proceedings of the Conference. 257 fol. pp. 1928. (*Id.*)

(d) International—*Contd.*League of Nations—*Contd.*Economic and Financial Section —*Contd.*

Supplementary agreement to the convention of Nov. 1927 for the abolition of import and export prohibitions and restrictions. (With protocol and final act.) 22 fol. pp. 1928. (*Id.*)

Committee of legal experts on bills of exchange and cheques. 26 fol. pp. 1928. (*Id.*)

Disarmament. Request of the governments of Czecho-Slovakia, Roumania, and the Kingdom of the Serbs, Croats and Slovenes for the consideration of the Council of the incident which occurred on Jan. 1, 1928, at the Szent-Gotthara railway station on the Austro-Hungary frontier. 27 fol. pp. 1928. (*Id.*)

International Labour Office—

Studies and reports. Series D (Wages and hours of work), No. 18. Wages and hours of work in the coal-mining industry. xix + 279 pp. Published in U.K. by P. S. King. 1928. 6s. (The Publishers.)

Series N (Statistics), No. 13. Methods of compiling housing statistics. 119 pp. Published in U.K. by P. S. King. 1928. 1s. 6d. (*Id.*)

II.—AUTHORS AND MISCELLANEOUS.

Achinstein (Asher). Studies in history, economics and public law, No. 292. Buying power of labor and post-war cycles. 164 pp. New York: Columbia University Press. London: P. S. King, 1927. 12s. (The Publishers.)

Aftalion (Albert). Cours de Statistique. 319 pp. Paris: Les Presses Universitaires de France, 1928. 40 fr. (The Publishers.)

American Economic Association. Economic essays contributed in honor of John Bates Clark. Edited by *J. H. Hollander*. viii + 368 pp. London and New York: Macmillan, 1927. 17s. (The Publishers.)

Ashby (Hon. A. W.). Economic conditions in Welsh agriculture. Suggestions of some remedies. 35 pp. Aberystwyth: University College, 1928. 1s. (University College.)

Banerjee (Pranathanath). Indian Finance in the days of the Company. viii + 392 pp. London: Macmillan, 1928. 12s. 6d. (The Publishers.)

Business Statistics Company. British railway securities, 1928. 32 pp. Cardiff: Business Statistics Co., 1928. 2s. 6d. (The Publishers.)

Carnegie Endowment for International Peace. British food control. By *Sir William Beveridge*. xx + 447 pp. New Haven: Yale University Press. London: H. Milford, 1928. 17s. 6d. (The Publishers.)

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ANNUAL LIST OF ADDITIONS TO THE LIBRARY.

Since the issue of Part IV, 1927, the Society has received, by presentation or purchase, the periodical (official and other) publications enumerated below.

(a) **United Kingdom and its several Divisions.****United Kingdom—**

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England and Wales -

Agricultural Statistics, 1927. Agricultural Market Report (weekly). Agriculture, Ministry of, Journal (monthly). Ecclesiastical Commissioners, Report, 1925-26. Education, Report, 1926-27. Health Ministry: Annual Report of Chief Medical Officer, 1926; Health of School Child, 1926. Judicial Statistics: Civil, 1926; Criminal, 1926. Local Taxation Returns, Pt. II, 1924-25. Poor Law Relief Returns (quarterly). Prisons, Report of Commissioners, 1926. Registrar-General: Statistical Review, 1926; Quarterly and Weekly Returns. Sea Fisheries, Report, 1926.

London. L.C.C.: Annual Report; Gazette; London Statistics, 1925-26; Statistical Abstract, 1917-26. Metropolitan Water Board, Report, 1927. Borough Accounts: Acton, Battersea, Hammersmith, Islington. M.O.H. Reports: Paddington, Poplar.

Municipal and other local returns. Accounts, 1926-27: Birmingham, Carlisle, Hull, Ipswich, Leicester, Liverpool, Manchester, Nottingham, Ossett, Southgate, Tunbridge Wells. M.O.H. Reports, 1926-27: Birkenhead, Birmingham, Derby, Liverpool, Manchester, Preston, Wigan, Wolverhampton.

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(a) **United Kingdom and its several Divisions—(contd.)**

The Accountant. Accountants' Magazine. Banker's Magazine. Biometrika. Cancer Review. Colliery Guardian. Colombian Trade Review. Commercial World. Economica. Economic Journal. Economic Review. Economist. Eugenics Review. Fireman. Financial Notes. Financial Review of Reviews. Illuminating Engineer. Insurance and Finance Chronicle. Insurance Record. Investors' Monthly Manual. Land and Liberty. London and Cambridge Economic Service Publications. Manchester Guardian Commercial and Supplements. National Temperance Quarterly. Nature. Peru. Policy-Holder. Post Magazine. Public Administration, Journal of. Public Health. Publishers' Circular. Raw Materials Review. The Secretary. The Signal. Statist. Stock Exchange Gazette. The Times and Supplements. Tropical Agriculture. Wallis Index Cotton Circular. Westminster Bank Review.

(b) **India, Dominions and Colonies.****India, British—**

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Mauritius—

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Reports, 1927. Prices, Wages and Hours of Labour, 1926. Trade and

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Rhodesia Chamber of Mines, Report, 1926, and Returns.

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Statistical Year-book, 1925-26. Annual Returns relating to : Agriculture and Live-stock, 1927; Factory Inspection, 1926; Industrial Accidents, 1922; Meat Consumption, 1926; Mineral Statistics, 1926; Trade, 1925. *Annales des Mines* (quarterly). *Bulletin Trimestriel. Revue du Travail* (monthly).

Brazil—

Trade Returns, 1927-28 (sheets), Trade, Foreign, 1922-26. *Rio de Janeiro. Health Office Bulletin* (monthly).

Bulgaria—

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Chile—

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China—

Lighthouses, List of, etc., 1928. Post Office Report, 1926. Post Office Savings Bank Report, 1926. Trade Returns, 1926. Shanghai Bureau of Markets, Prices Report (monthly).

Cuba—

Annual Returns relating to : Banking, 1926-27; Education, 1926-27; Fisheries, 1926-27; Migration, 1926; Sugar Industry, 1924-25; Trade, 1926; Vital Statistics, 1927.

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Statistical Year-book, 1927. Annual Returns relating to : Agriculture and Live-stock, 1927; Electrical Undertakings, 1926-27; Housing and Rents, 1925-26; Joint Stock Companies, 1921-27; Navigation and Merchant Shipping, 1926; Prices of Cereals, 1927; Production, 1926; Taxation, 1926-28; Trade, 1926 (also monthly returns). *Nationalsøkonomisk Tidsskrift* (monthly). *Statistiske Efterretninger* (monthly). *Copenhagen. Statistical Year-book, 1927. Annual Health Report for 1926. Weekly Vital Statistics.*

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Reichsarbeitsblatt (monthly). *Reichs-Gesundheitsblatt.* Vierteljahrshefte zur Konjunkturforschung. Vierteljahrshefte zur Statistik des Deutschen Reichs. Wirtschaft und Statistik (to date).
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Greece—

- Commission Financière Internationale. Report, 1926. Trade, Annual, for 1921-22, and monthly for December and years 1924-27.

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 Nippon Life Insurance Company, Report, 1927.

Latvia—

- Riga.* Statistical Year-book, 1925-26.

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Boletín de la Sociedad Mexicana de Geografía y Estadística. Revista Mexicana de Ingeniería.

Netherlands—

Statistical Year-book, 1927. Revue mensuelle du Bureau Central de Statistique. Annual Returns, mainly for 1926-27, relating to : Army and Navy Medical Statistics, Bankruptcy, Causes of Death, Collective Bargaining, Crime, Financial Statistics, Labour Statistics, Strikes and Lock-outs, Trade Unions, Movement of Population, Penitentiary Statistics, Poor Relief, Public Health, Savings Banks, Shipping Statistics and Trade.

Dutch East Indies. Statistical Abstract, 1926.

Norway—

Statistical Year-book, 1926-27. Reports of Central Statistical Bureau and Central Statistical Commission, 1927. Annual Statistics, mainly for 1926-27, relating to : Agriculture and Live-stock, Army Recruits, Assurance Companies, Bank Returns, Bankruptcy, Education, Elections, Industries, Justice, Mines and Factories, Lunacy, Meat Inspection, Movement of Population, Municipal Finance, Poor Relief, Post Office, Prisons, Public Health, Railways, Savings Banks, Sea Fisheries, Shipping, Social Insurance, Telegraphs and Telephones, Trade, Veterinary Service, Wages. Statistiske Meddelelser (monthly). Sociale Meddelelser (monthly).

Oslo. Statistical Year-book, 1927. Monthly Statistical Bulletin. Public Health Report, 1926. Sickness Insurance, 1926-27. Statistisk Månedsskrift (monthly).

Paraguay—

Trade, 1927 (sheets).

Peru—

Statistical Abstract, 1926. Trade Returns : annual, 1925; also monthly.

Poland—

Statistical Year-book, 1927. Informations Statistiques (fortnightly). Revue trimestrielle de Statistique. Labour Statistics (monthly). Trade Returns : annual, 1926-27; also monthly.

Lodz (city). Statistical Year-book, 1926.

Portugal—

Vital Statistics, 1919-22.

Roumania—

Statistical Year-book, 1926. Bulletin de Statistique (monthly). Agriculture and Live-stock, 1926. Joint-Stock Companies, 1927. Mineral Statistics, 1926-27. Prices, 1927. Trade Returns, 4th quarter, 1926.

Russia—

Financial Messenger (quarterly), and other publications of the Central Statistical Office. Conjunction Institute, Economic Bulletin.

Moscow. Statistical Year-book, 1926. Statistical Bulletin (monthly).

Ukraine. Statistics of the Ukraine : Annual returns dealing with : Finance, Industry, Local Government, Occupations, Trade.

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Salvador—

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Siam—

Statistical Year-book, 1926-27.

Spain—

Statistical Year-book, 1925-26. Boletín de Estadística (quarterly). Boletín Demográfico (quarterly).

Madrid. Statistical Bulletin (weekly).

(c) Foreign Countries—Contd.

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Statistical Year-book, 1927-28. Annual Statistics, mainly for 1926-27, dealing with Agriculture and Live-stock, Agricultural Wages, Assurance Companies (Life and Fire), Banks, Causes of Death, Co-operation, Education, Elections, Emigration, Excise, Factory Inspection, Finance (State and Local), Fire Insurance, Fisheries, Forests, Health of Army and Navy, Housing and Rents, Industrial Accidents, Industrial Production, Industries, Justice, Labour Strikes, Land Surveys, Lunacy, Milk Industry, Mines, Pilotage, Poor Relief, Post Office, Prisons, Public Health, Railways, Roads, Savings Banks, Social Statistics, Telegraphs and Telephones, Trade and Navigation, Veterinary Service and Vital Statistics, Water Power.

Ekonomisk Oversikt. Ekonomisk Tidskrift. Kommersiella Meddelanden. Sociala Meddelanden. Nordisk Statistisk Tidskrift. Swedish Economic Review.

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Stockholm. Statistical Year-book, 1927.

Bank of Sweden, Year-book.

Switzerland—

Statistical Year-book, 1926. Assurance Companies, 1926. Customs, 1926. Finance, 1926. Trade returns: annual, 1926, Pt. 2, 1927, Pt. 1; also monthly returns. Trade and Industry, Report, 1926. Vital Statistics (weekly).

Bern (Canton). Mitteilungen des Kantonalen Statistischen Bureaus (monthly).

Bern (City). Beiträge zur Statistik der Stadt Bern (monthly). Vierteljahresberichte.

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